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Fourteenth Annual Meeting, Louisville, Kentucky, November 15-18, 1920

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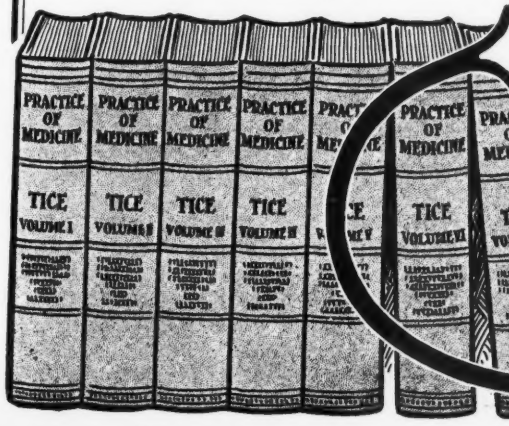

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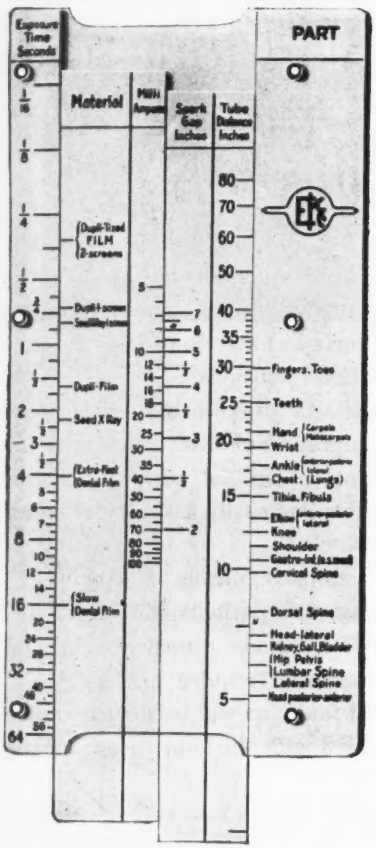

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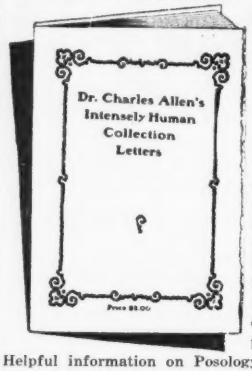

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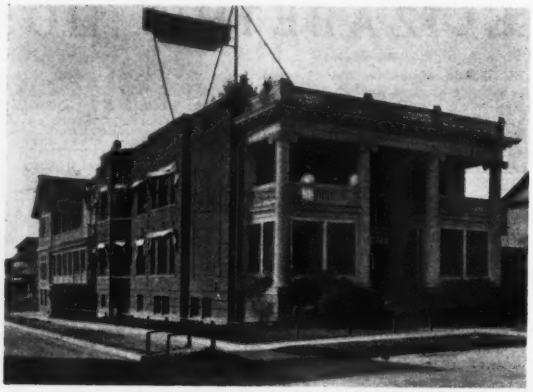

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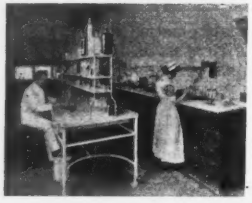

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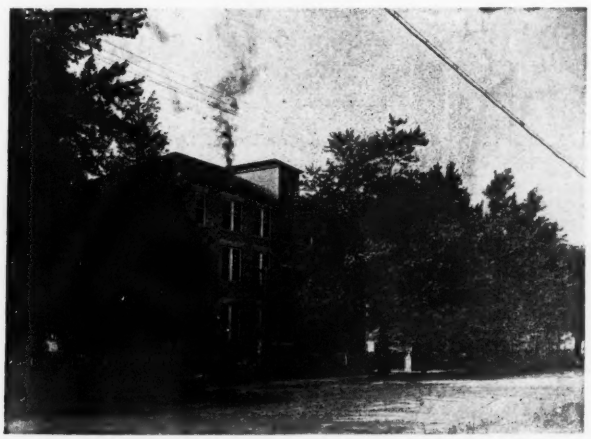

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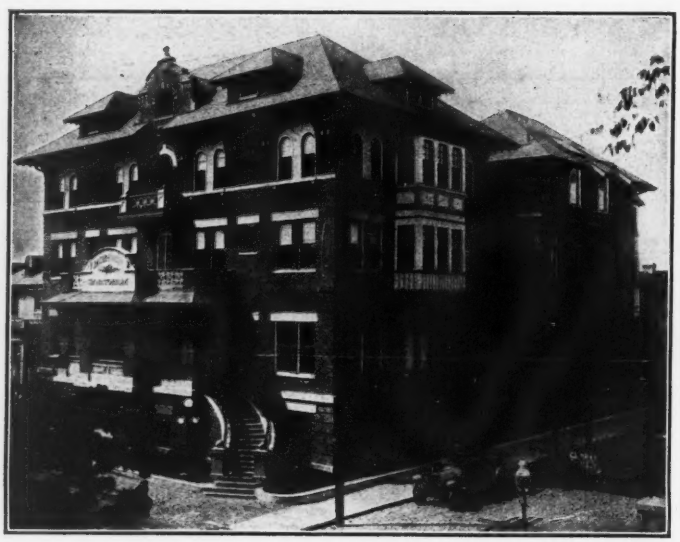

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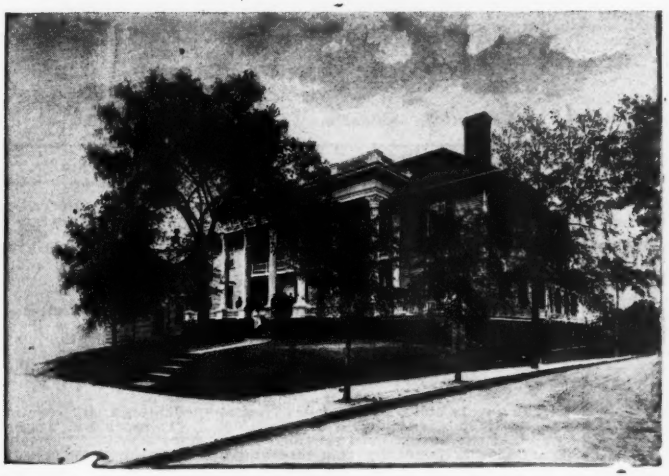

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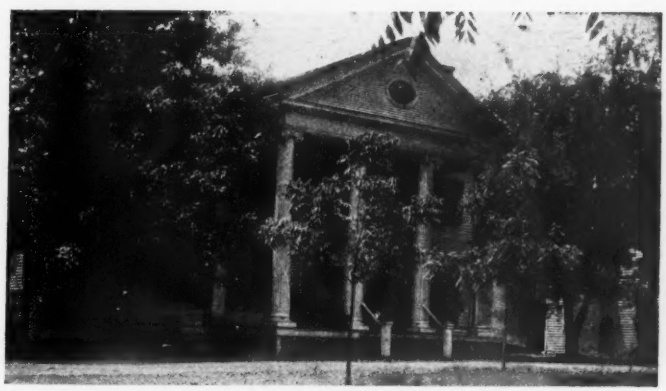

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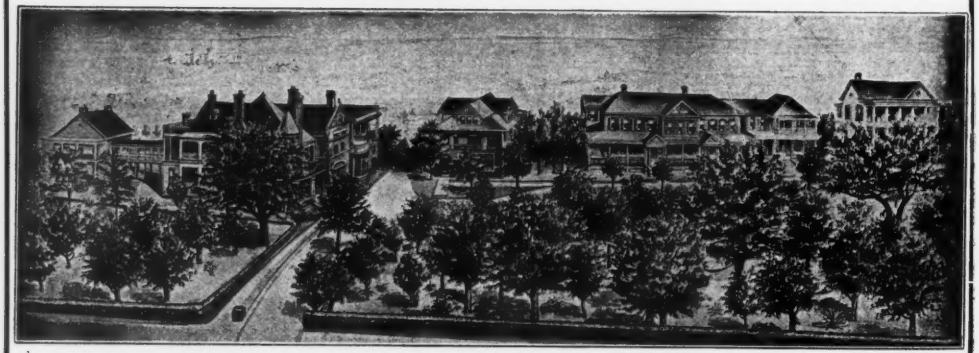

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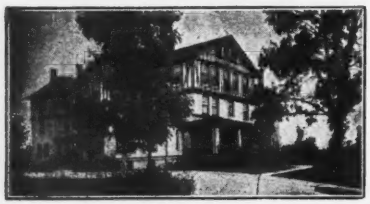

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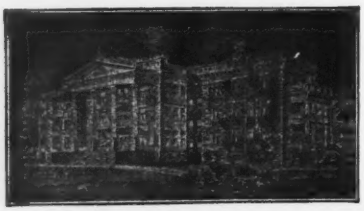

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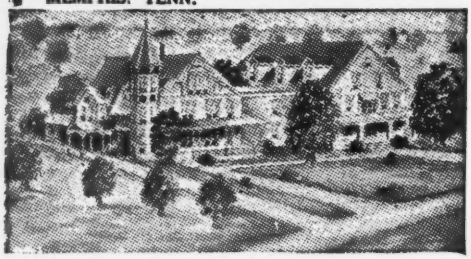

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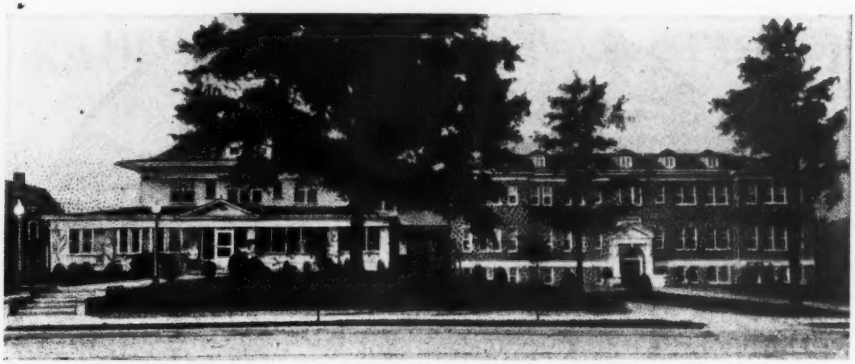

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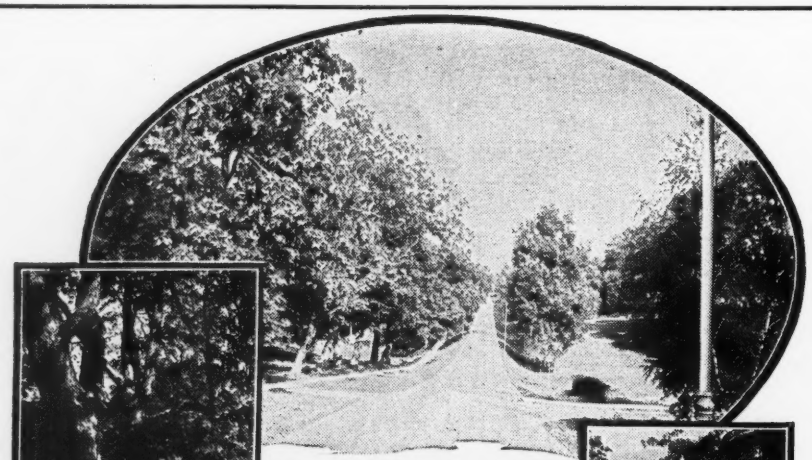

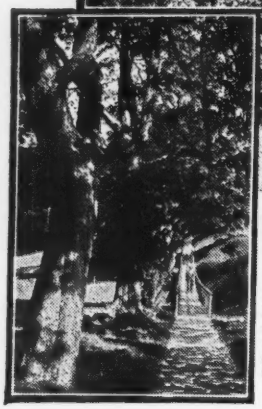

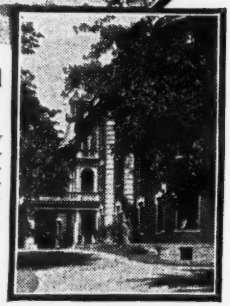

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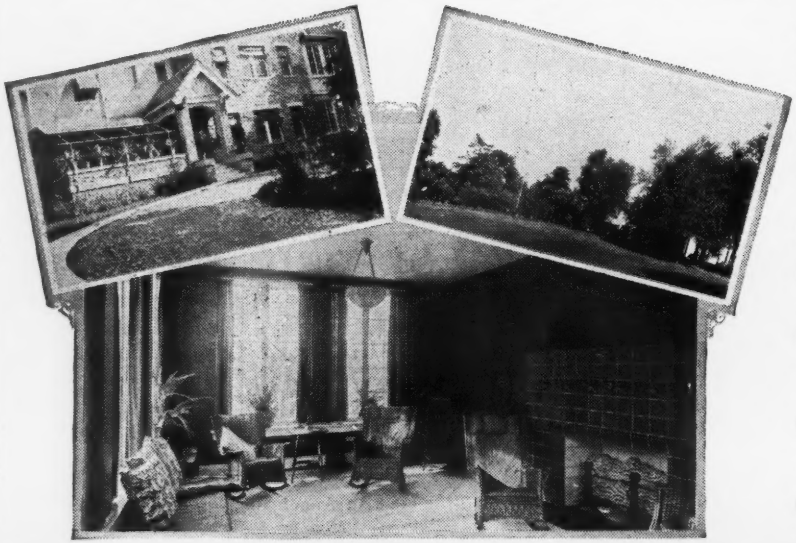

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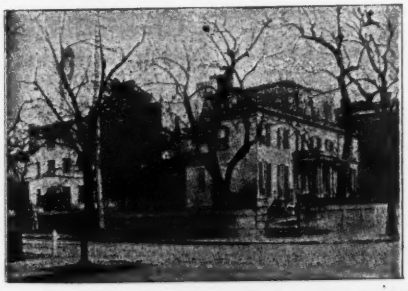

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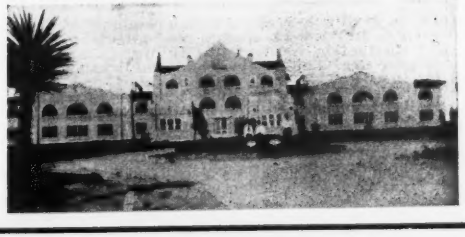

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Volume XIII AUGUST 1920 Number 8

MEDICINE

INTERNAL DISEASES, PEDIATRICS, NEUROLOGY, DIAGNOSTIC METHODS, ETC.

BRIGHT'S DISEASE WITH SPECIAL REFERENCE TO TREATMENT*

BY HENRY A. CHRISTIAN, M.D.,
Boston, Mass.

This is a subject of universal interest to the practititioner of medicine. He can go but a little way on his road without encountering the problems of this disease, which has a high place in the mortality statistics of towns, states and countries. I am to talk of a disease which you all know and which no inconsiderable proportion of you sooner or later may die of.

It is a disease filled with interest for him that would delve beneath the surface and question the statement that seems so clear and definite in the printed text. It is a fascinating subject of inquiry for him who studies closely disease manifestations in his patients and ponders the cause of what he observes. Though recognized and described by Bright a hundred years ago, vast fields for investigation remain.

In thinking of a disease entity I like to get a bird's-eye view. To do so one needs to summarize the known important facts of the condition and to fuse them into as complete a picture as is possible. To make it a well defined picture bold strokes are needed, and many details must be omitted. It is much the same process as determines the preparation of the cartoons that the master artist boldly sketches in preparation for the detailed work of the elaborated picture.

*Jerome Cochran lecture before Medical Association of State of Alabama, Anniston, Ala., April 21, 1920.

For such a sketch of nephritis we need to think of the kidney as an organ concerned alone in elimination. Its work is to remove from the body waste products, non-threshold substances, adequately diluted so as not to injure the eliminating cells and at the same time to retain for the body's further use such substances as can be further utilized in the body economy, threshold substances. To accomplish this a complicated mechanism is required. Excretion must be brought about as a result of physical filtration combined with selective reabsorption. The unit for this is a tuft of thin-walled capillaries and a filtration membrane composing the glomerulus and a long twisted tubule lined at different levels by varying types of epithelial cells in close proximity to other capillary vessels.

Nephritis, or Bright's disease, in a pathological sense consists in degenerative changes of a progressive nature in these renal structures, often accompanied by exudation and infiltration and followed by proliferation. As our present day knowledge stands, we can safely subdivide these changes into acute and chronic. We recognize that such changes cause certain symptoms in our patients, but we can not correlate closely any particular structural change in the kidney with most of the manifestations of the disease. It would seem that our tendency is to pay too much attention to structural change in the kidney and too little to the manifestations of a general disease process which is not merely the resultant of renal lesion.

To me the best working basis is afforded by a very simple clinical classification of

nephritis into acute and chronic with further subdivision of the chronic into cases with edema and cases without edema. We find considerable variation in the degree of severity of symptoms in the cases, but I believe to attempt to subdivide much further into types is more confusing than helpful. Possibly it is well to recognize a subacute type of nephritis.

Variations occur in individual cases, chiefly representing degrees of severity of process, but such a simple clinical classification as suggested above suffices for the needs of present-day management of nephritic patients, and is about as far as our knowledge justifies us in going in subdivision.

As to etiology, we recognize that most of the acute cases arise as a result of acute infections and that we know very little of the cause in chronic cases. The majority of acute cases recover. Chronic cases rarely give a history of an antecedent acute attack. The many assigned causes of chronic nephritis can neither be denied nor accepted. We must admit that they are not proven. It is extremely unusual to encounter a case of chronic nephritis whose cause we can say we know. The very general assumption that chronic nephritis results from acute nephritis has no justification in observation.

The relation of increased blood pressure to nephritis is important. Marked increase usually comes in cases without edema. In chronic nephritis with edema blood pressure is more apt to be but moderately elevated except in the end stages, when it may be very high. Usually in acute nephritis blood pressure is only moderately elevated. High blood pressure often occurs without demonstrable renal inefficiency, the so-called essential or vascular hypertension. Consequently it seems pretty evident that renal insufficiency is not the primary or only cause of high blood pressure, though in some way the two conditions are frequently associated. Finding a high blood pressure does not justify the diagnosis of chronic nephritis.

The cause of edema in nephritis is unknown. There are many theoretical explanations; none of these explain all cases and treatment of edema based on any single theory often proves ineffectual.

By uremia we mean the toxic manifestations, mainly cerebral, of nephritis. It is due to a purely hypothetical toxic substance as to whose nature we know nothing, and whose existence even has no real proof. The diagnosis, uremia, is often incorrect; cerebral hemorrhage and other cerebral vascular disturbances are frequent causes of error in diagnosis in patients with hypertension. Uremia is most frequent in chronic nephritis without edema, but may occur in all forms of nephritis, acute and chronic. In acute nephritis it is not of very serious prognostic import; in chronic nephritis it is serious.

Albumin and casts in the urine are found almost without exception in nephritis. Neither one nor both together are diagnostic of nephritis. Both seem compatible with good health as shown by studies in the British Army and by studies carried out on college students. I suspect that finding albumin and casts in otherwise normal individuals has caused much needless alarm and interdicted much good business to insurance companies. Even such strenuous conditions as life in the trenches seemed to do no harm to otherwise normal soldiers with albumin and casts in their urine, and they were no more liable to acute nephritis than their fellows. When albumin and casts are found careful study should be made of the patient for other evidence of nephritis. If none are found limitations to exercise and diet are not called for.

We now have excellent methods of measuring renal function and their use in nephritic cases is very helpful, especially in prognosis, though useful in both diagnosis and treatment. 'Phthalein excretion, blood nitrogen determinations, variations in specific gravity, amount of urine excreted and concentration of salt in specimens taken at frequent intervals are the methods of most usefulness. The first and last of these are simple enough to be used by every practitioner on patients in his home and should be much more generally applied than is now the case.

With this sketch of nephritis let us turn our attention to treatment. Treatment of nephritis is purely symptomatic and largely empirical. Empiricism is being reduced by degrees as we increase our

knowledge of nephritis. Empirical treatment may be most excellent treatment, but it can be improved by increased knowledge. We can say, I think justifiably, that we have almost no etiological knowledge of nephritis that aids us in treatment. The structural concept of nephritis has not helped much in treatment. Increased knowledge of renal function has improved treatment. Functional treatment is symptomatic treatment.

What do we aim to accomplish in acute nephritis? Two things: to remove causes and retard progression of the disease. Most symptoms of acute nephritis take care of themselves without special treatment. In acute nephritis we need to recognize two things; almost all patients get well; they have very few uncomfortable symptoms. As already said, the cause most often lies in an acute infection. To remove the cause of acute nephritis, clear up the infection as rapidly as possible and prevent its recurrence. To retard progress, put the patient under the best conditions of general and renal rest. This means in bed with plenty of fresh air and a simple nutritious diet rather low in salt and proteid, but not an extremely restricted diet. Catharsis and sweating are not needed. Mild laxatives are indicated. Diuretics on a purely theoretical basis in most cases are not called for; if given they may do harm, so why use them? Edema is rarely marked enough to be even uncomfortable; it requires no special treatment except when present in marked amount.

Uremia in acute nephritis occurs occasionally; when present it needs treatment. As already stated, uremia is supposed to be the result of a hypothetical toxic substance formed or retained in the body. Consequently on a theoretical basis we might either attempt to neutralize or destroy the toxic substance or increase its rate of elimination. We know of no means of neutralizing or destroying this hypothetical toxic substance. We can seek to increase its rate of elimination by stimulating elimination through all possible channels of excretion. This we have to attempt because we do not actually know how the substance causing uremia is eliminated from the body. As the toxic effects are general rather than strictly local, we are justified in assuming the presence of the toxic substance in the blood. At any rate, bleeding is the promptest and most effective means we have of counteracting the symptoms of uremia, particularly those of acute uremia. Often it would seem that bleeding is actually a life-saving process.

Elimination in uremia is further brought about by sweating, by active catharsis and by diuresis. Sweating is best produced by mechanical means, hot air baths, electric light sweats, hot packs or hot water baths. Drug sweating is rarely desirable. Occasionally in patients in whom sweating is very difficult to produce, a small dose of pilocarpin may be used to start the process, but it is not safe to resort to any extensive use of pilocarin.

Saline cartharsis, best with magnesium sulphate, helps particularly in the more chronic types of uremia. Diuresis is best produced by increased fluid intake. I am extremely skeptical of the value of diuretic drugs in uremia.

When there are active convulsions, these can be best controlled by light chloroform anesthesia. Morphin is frequently given, but I have the impression that on the whole its use is best omitted as a means of influencing the convulsive seizures of uremia.

When we come to chronic nephritis, the problem is very different. Moreover, treatment should vary much with the severity or stage of the process and the symptoms shown by the patient. Since we have so little knowledge of the real causes of chronic nephritis, we can do but little on the basis of etiology toward preventing or retarding the progress of the lesion. If we can find areas of infection, so-called focal infections, their removal seems the very obvious thing. Undoubtedly, the presence of the infection is a harm to the body, and to remove it improves conditions. I doubt, however, whether any very direct effect on the nephritis is ever obtained. The present almost indiscriminate removal of tonsils and extraction of teeth, to my mind, are fads run riot. It is practically only in adults that the question of tonsillectomy arises with chronic nephritis. If this is viewed as a serious surgical operation, requiring roughly six months for subsequent

return to normal equilibrium, then the physician has a good basis for his advice as to removal of tonsils, presumably infected, in a patient with chronic nephritis. If the tonsils are to be removed they must be removed completely and thoroughly, not partially and hurriedly, and this is why tonsillectomy is a real operation. If the patient is having repeated attacks of tonsillitis or has tonsils definitely infected, the operation should be advised. When there is real doubt as to the tonsils being diseased, I say leave them alone in so far as any causal relation to nephritis is concerned. As to extraction of teeth, it is more a question of looks and convenience. However, God-given teeth, kept in good condition by a competent dentist, are more effectual organs of mastication than any variety of store teeth, and so are preferable. The x-ray which shows change at the tooth root is by no means diagnostic of apical abscess, and I am perfectly sure that daily great numbers of teeth are being uselessly extracted. So I would say exercise great common sense on the question of tonsils and teeth in relation to chronic nephritis. The same view should apply for other possible focal infections.

Much of the management of the chronic nephritis hinges on the theory of physiological rest for the injured or overworked kidney. This theory is based in part on the idea that to a certain extent the kidney excretes from the body irritating substances which in their passage through the kidney will irritate the renal cells. These may be reduced by excluding from the diet articles, such as those containing much of the extractives or foods highly flavored with condiments, whose digestion results in the formation of such irritating substances. In part the theory is based on the idea that the kidney does a definite work in the excretion of various substances and this work may be decreased by decreasing the ingestion of foods which in their breakdown go to make up these products. Furthermore, certain substances, by reason of their structure, cause a greater amount of work in their excretion than other simpler substances, and by appropriate diet the former substances, more difficult of excretion, may be replaced by the latter to a considerable extent. By means of a relatively simple diet, rather low in proteid, very low in extractives, free of spices and other condiments, rather low in NaCl, and with moderate fluid content, we can reduce to a relative minimum the amount of work the kidney is called upon to do, and so increase its opportunity for rest and repair. It certainly seems rational to think that there is less work required of the kidney in the excretion of a urine of moderate amount containing relatively little sodium chloride and other salts, urea, uric acid and other nitrogenous substances, etc., as contrasted to a more abundant urine richer in all of these ingredients. Also it seems likely that the damaged renal cells have better opportunity for restoration when they are not overworked.

To bring about physiological rest we select a diet poor in proteid as contrasted to the average normal diet and poor in sodium chloride. Proteid calories are replaced by carbohydrate and to a less extent by fats. Fluid intake is set at a level of about 1,500 c. c. per 24 hours. The exact degree of reduction in protein, salt and fluid should vary with the degree of the nephritic process. In milder cases combined with such dietary restrictions should go periodic baths of various sorts to cause moderate or marked sweating. Catharsis to give free, not loose, movements are needed for the average nephritic. Diuretics seem to have little place in the treatment.

When uremia occurs in chronic nephritis it is to be treated as described under acute nephritis, only it is more important to be energetic in its treatment.

Hypertension is frequent in chronic nephritis, but requires no particular therapeusis other than the diet, baths, catharsis, etc., already described. Vasodilator and other drugs to lower blood pressure are of very little real use and I almost never use them. A high blood pressure causing marked symptoms may be relieved by bleeding. The above should not be taken to imply that high blood pressure and its symptoms are not relieved by treatment. The general management of the nephritic, as I have indicated, is also the best management for the particular condition of high blood pressure.

Edema in certain types of nephritis is

very annoying. Reduction in fluid intake and restriction of protein and especially of salt in the diet is indicated. In some cases the edema is closely parallel to salt intake, but in my experience the cases with edema, so easily controlled as by salt restriction, are rare.

The high protein diet advised by Epstein for edematous nephritics, in my hands, has not given good results. Similarly the alkaline treatment of Fischer has been disappointing. Continued catharsis sometimes helps. When edema is marked mechanical removal gives prompt, but, as a rule, only temporary relief.

In the nephritic the edema often is more the result of cardiac than renal disturbance, and in these cases digitalis in active dosage, alone or combined with a diuretic as sodiotheobromin salicylate or theophyllin, gives a very prompt and efficacious diuresis. With a normal heart and edema from renal insufficiency, I have never seen a diuresis from digitalis, and very rarely one from the diuretic drugs.

In the time available I have been able to present the subject in but a sketchy way, with many omissions. If nothing more has been accomplished, I have at least stirred up some doubts in your minds as to the value of the removal of tonsils and teeth and the use of diuretic drugs in nephritis. Indiscriminate tonsillectomy and tooth extraction are useless and may be harmful. If you use diuretics, it is essential that you measure fluid intake and urine output in your patients and judge of the value of the diuretics on the basis of whether or not they actually increase the output of fluid from the body. If they do not act to cause a diuresis, then you are not justified in continuing their use in a given case. It is better not to have theories as to diuretics, but to know actually what they are causing in the patient you are treating. This you can find out by simple observation. It is absolutely wrong to diagnose nephritis on the basis of finding albumin and casts in the urine, or because of any single symptom or sign. Bright's disease is a general condition, not solely a disease of the kidneys. It must be recognized from observed general conditions. Some people treat a patient on the basis of a diagnosis, not on the basis of a knowledge of actual conditions in that individual patient. This method of treating Bright's disease is probably worse than no treatment. On the other hand, intelligent individual management of the nephritic patient can accomplish much. If this is your goal, then you need to study your patients thoroughly. Simple means, such as are available to each and all of you, are sufficient. It is not the methods which you are not in a position to use, but those which you can use but do not use, that are responsible for giving to your patients treatment less efficient than you are actually capable of.

THE SIGNS AND SYMPTOMS OF HYPOPITUITARISM*

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The endocrine glands play such a large part in the physical life of every individual, and diseases affecting them are so common, that the question of an endocrinopathy should be present in the mind of every clinician as he studies a patient. Diseases of the thyroid gland, by virtue of its superficial position, and most frequently by gross ocular proof of pathology, are easily in the forefront of the endocrinopathies, for even a layman can note a thyroid lump and a mother undue fullness in the neck of her growing daughter. Superficial location and easy vision accent the importance of the thyreopathies. On the contrary, the inaccessability of the pituitary, the difficulty of approach by the surgeon, the anatomical division into two lobes and three parts, the variable hyper- and hypo-activities of the two lobes, the apparent influence on the thyroid, the adrenals, the testes and the ovaries, the physiological changes in menstruation and pregnancy, constitute the most difficult problem for the clinician in endocrinology. The frequency of abnormal function of the pituitary is possibly too often overlooked. This paper is a plea for the persistent in-

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clusion of this gland in the clinical repertoire of the physician, and aims to accent the signs and symptoms of hypoactivity of the gland.

The pituitary is essential to life. The crushing of the infundibulum produces death as certainly as a hypophysectomy. The secretion of the anterior lobe is discharged directly into the blood sinuses. The anterior lobe is more physiologically essential to life than the posterior, and its removal leads to a train of symptoms as glycosuria, polyuria, inactivity, unsteadiness, hypothermia, abnormal vertebral curve, slow pulse and respiration, tetanic contractions, lethargy, somnolence, coma and death. This lobe presides over somatic growth, activity and sexual development. Anterior lobe deficiency, either in experimental animals or clinically in acromegaly or tumor is proved by Cushing's thermic reaction, an elevation of temperature by injection of anterior lobe extract. Inconsistencies, experimentally and clinically, appear in contrasting functions of the two lobes, and they can not be completely differentiated at present.

Acromegaly is probably due to a hyperactivity of the anterior lobe. Infantilism, with sexual dystrophy, excluding infections and cardiopathies, intimates hypopituitarism, as illustrated by a man 31 years old, 140 cm. (4 ft. 7 in.) tall, presenting at autopsy only a few cells of an anterior lobe. Dwarfism, infantilism, "an adult in a small mould," warrant a pituitary study. Hypopituitarism originating in adolescence may show failure of growth of long bones, feminine type pelvis and genu valgum, tapering hand, and prominence of the maxillary region. Animal growth after castration is probably due to pituitary hyperplasia and increased production of the hormone of growth.

Pituitary hyperactivity produces thick skin, connective tissue hyperplasia, larger folds and deeper furrows, increased activity of sebaceous and sweat glands, hypertrichosis, thick nails, a cutaneous overactivity of glands and appendages. Hypopituitarism involves a cutaneous underactivity, as illustrated by a smooth, thin, almost infantile skin, absence of perspiration and sebaceous secretion, no pitting, thinness or absence of axillary and pubic hairs, or a feminine distribution of the hirsuties. Abundant head hair may be thinned. Falling hair after pregnancy or long illness is probably the result of a transient hypopituitary state. The nails are thin and the crescents may be absent; a peculiar smooth, marble pallor may overlie a non-resisting skin. Pigmentation may develop and raise the question of associated adrenal insufficiency or ovarian disturbance.

Drowsiness and somnolence are resultants of pituitary deficiency, probably of the anterior lobe. This is illustrated by the case of a man thirty years of age, who suffered from drowsiness for eight months. At autopsy an anterior lobe tumor of undifferentiated anterior lobe cells, such as occur in hibernating animals, was found. After hypophysectomy, torpid animals are roused to normal activity by glandular injections.

Young animals after hypophysectomy are usually sexually inactive, the males showing testicular atrophy and females never coming to heat. In girls of the Froelich type, amenorrhea, or quite delayed menstruation is the rule, and in both sexes infantile sex organs. Post-adolescent hypopituitarism may develop amenorrhea or impotence with atrophy of the sexual organs. Pre-adolescent early sexual development intimates early and abundant cells of Leydig in the testis as well as pituitary and other endocrine influences. The absence of secondary sexual characteristics in an adult, as for example one who is hairless, beardless and has a child's voice, a male who has the sex secondaries of a female, or the reverse, indicate pituitary and gonadixal disturbances.

Hyaline bodies are formed in the pars intermedia and pass through the pars nervosa into the cerebrospinal fluid. The posterior lobe, including the pars intermedia or its epithelial covering, contains hormones which raise blood pressure, dilate the pupil, cause diuresis, stimulate intestinal, bladder and uterine contraction, stimulate galactogenesis, stimulate the heart, and determine carbohydrate metabolism. A hormone deficiency in this lobe shows hypothermia, with the accompanying slow pulse, respiration and low metabolism, the very metabolic opposite of

thyreotoxicosis. Such patients naturally complain of cold.

Polydipsia and polyuria with dilute urine intimate diabetes insipidus, and are due to a posterior lobe deficiency of the renal hormone. Continued injections of pituitrin are almost specific, though lesser results may be had by oral administration. Polyuria with dilute urine in syphilis or cancer predicates gumma or metastasis of the same lobe and, after trauma, injury. Cancer of the breast, with later diabetes insipidus, caused by a cancerous nodule in the posterior lobe, is reported in two recent cases. Associated with the disease may be infantilism, hypotrichosis, adiposity (rarely), glandular stigmata and psychoses. A recent case, daughter of an acromegalic mother, had diabetes insipidus and infantilism, passing 174 oz., or 5,220 c. c., in 24 hours. This dropped to 64 oz., or 1,920 c. c., after one injection of pituitrin.

Tolerance for sugar is a diagnostic measure of posterior lobe activity. High tolerance means posterior lobe deficiency with increasing obesity. A clinician should never see a very fat person without thinking of the posterior lobe. Continued intravenous injections of piuitrin lead to emaciation and transient glycosurias. Injury or blood extravasation into the posterior lobe may cause glycosuria. Pregnancy, acromegaly, adolescence and cerebral trauma may have an associated glycosuria due to a posterior lobe influence. The pituitary as well as the pancreas may cause diabetes. The blood sugar estimates this lowered basal metabolism. Bilateral lipomatosis, Dercum's disease with its fourfold adiposity, tenderness and pains, asthenia and psychoses are probably due to deficiency of the hypophysis.

Constipation in hypopituitary states is common, due to the deficiency of the posterior lobe hormone. The effect of pituitrin on peristalsis is well known, and is of value in post-operative ileus and the meteorism of pneumonia and tuberculosis.

Epileptic seizures and uncinate gyrus seizures may result from pressure of a pituitary tumor on the gyrus, or may be dependent upon cortical irritability as a result of a hypopituitary state. The dried glands may strikingly relieve such epilepsy.

Menorrhagia without apparent cause from history or pelvic examination may be relieved by pituitary extract. The pituitary is probably antagonistic to the hyperactive ovaries that cause the menorrhagia.

Pre-adolescent hypopituitarism is illustrated by three types:

1. The type Froelich: infantilism, adiposity, sexual underdevelopment, with or without tumor, the adiposo-genitalis syndrome.

2. The type Lorain: infantilism, no adiposity, infantile sex organs, secondary sexual characteristics deficient.

3. Types that combine and reverse overgrowth, obesity and sexual precocity. One recently in a negro boy showed adiposity, enlarged mammae, broad pelvis, genu valgum, sexual precocity and overgrowth, with epileptic seizures.

Post-adolescent hypopituitarism is represented by:

1. Females, marriage type. Sudden gain of weight, amenorrhea, the young married woman who becomes fat and remains childless. This condition may develop in a multipara with superinvolution and lactation atrophy, without change in the libido or external genitals.

2. Males. Typical adiposo-genitalis in adults, obesity, feminine type breasts, body, hirsuties, genu valgum, hypotension, hypothermia with mental change from languor to dementia or epileptic seizures.

In any of these types tumor may occur, with the classic symptoms of increased intracranial pressure, headache, atrophy, choked disc, amblyopia, hemianopsia, exophthalmos, nausea, vomiting. Any case with pituitary signs or symptoms and an intimation of pressure should be studied for pituitary or neighborhood tumor. Stereo rays of the sella are in order. The tumor may be of pituitary origin, adenoma, cyst, carcinoma, gumma, and may cause hyper- or hypoactivity of the gland. Neighborhood tumors of extra-pituitary origin with compression usually cause hypopituitarism.

Therapeutically, the gland may be had in preparations of the anterior lobe, the posterior lobe, pituitrin, or the extract of the posterior lobe, and tablets of the whole

gland. Dosage after diagnosis may be empirical, but the gland should be given in sufficient doses for results.

SUMMARY

Undergrowth, dwarfism, dysgenitalism, feminine hirsuties, feminine type skeleton, lack of secondary sexual characteristics, genital atrophy and impotence, headaches, languor, weakness, may appear in varying degrees in different cases at different periods. The classic signs and symptoms of hypopituitarism are subnormal temperature, dry skin, adiposity, low blood pressure, slow pulse, constipation, amenorrhea, drowsiness, inactivity. Lack of attention, impairment of memory, actual dullness, mild psychoses to actual convulsive seizures with epileptic attacks may occur. The cause may be glandular deficiency of one or both lobes, a pituitary tumor with damage of the gland, a neighborhood tumor or hydrocephalus with pituitary pressure. The symptoms of intracranial tumor may be more prominent than those of pituitary deficiency. Infantilism, dysgenitalism, obesity, symptoms of intracranial tumor, warrant pituitary study.

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DISCUSSION

Dr. W. H. Witt, Nashville, Tenn.—There is hardly anything more brilliant, and nothing more interesting, in the history of medicine than the development of our knowledge of these so-called ductless glands. Beginning with the study of the thyroid, which was probably the first to be put on a definite basis, and from that to the study of the adrenals, a study of portions, at least, of the pancreas, and then taking up the study of the hypophysis, the pineal glands—all these constitute a brilliant thing in medicine; but as yet, it is really far from being thoroughly worked out.

There has also been presented in a most remarkable way the interrelation between the activity of these different organs. This interrelation is one of the things that has made a perfectly satisfactory study more or less difficult, but as time goes on these difficulties are gradually being surmounted. The individual practitioner, no matter where he is situated, whether in a city or country town, whether he has an opportunity for very thorough scientific study or not, can contribute something toward the elucidation of this difficult problem. It was quite interesting to me to read a portion of a chapter in MacKenzie's book on heart disease as to the value the country practitioner could have in the study of anything in medicine. He may simply use his powers of observation and make clinical records from time to time so that the results of his observations can be given for subsequent classification. MacKenzie maintains that what skill he has in the study of heart disease as a specialty has not been due to a large hospital connection and experience, but to close study of patients in private practice. In private practice we can interest ourselves in making careful records of all cases that show evidences of over- or underactivity of these glands.

Dr. Roberts has detailed to us the various symptoms, and they are multiple, that grow out of disturbances of the hypophysis. Whether they apply to the genital organs which they frequently do, to the ordinary secondary sexual characters, or to the bony frame, the mental states, the condition of the skin and its appendages—all of these things we can from time to time study and record in the observations of our individual cases. We can get autopsies when possible, and in time each one of us can contribute something towards the elucidation of the difficulties of the study of the hypophysis.

Dr. Roberts (closing).—Attention has been called to the fact that in some of these pre-adolescent cases there may be enuresis (bed wetting). It is not a constant symptom, and it increases the difficulty of these cases. Nothing seems to be absolutely constant about them; they are variable.

Lastly, I want to pay a passing compliment to the work of Dr. Harvey Cushing for his monumental monograph on the pituitary. It is possibly the acme of American research and a real contribution to the medicine of our time. It is a training in medical science to read the book, whether one gets anything out of his patient investigation or not.

THE TREATMENT OF VISCEROPTOSIS*

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My excuse for writing a paper on this subject, already so well and so much discussed, is the frequency with which one meets cases of visceroptosis, either neglected or improperly treated. I have nothing new or original to add to the treatment of this condition, but it has occurred to me that a discussion of it here might arouse our interest and stimulate us to greater efforts towards relieving these unfortunate patients.

These people comprise a large part of our "chronics" who go from doctor to doctor without experiencing any relief. The symptoms of which they complain often seem merely nervous, or they may be referred by the patient to some particular organ in the abdominal cavity. If the physician's examination is not careful and complete the patient, in the first instance, is put down as a neurasthenic and given a nerve sedative; or, in the second place, treatment may be directed to the organ giving the most prominent symptoms and its relation to the whole abdominal cavity entirely overlooked.

One sees many of these cases that have been operated upon for chronic appendicitis, retroversion of the uterus and movable kidney, the result of the operation being a temporary improvement in the symptoms, followed after a very few months by a marked increase in their severity. If the surgeon had the after-care of these patients as does the physician, I think operation would be much less frequent. It would not take him long to see the futility of an operation on one organ when most of the abdominal content is involved. It is up to us as medical men to convince the surgeon of the uselessness and, in many instances, the harm of operations for this ailment.

Visceroptosis, enteroptosis, or Glenard's disease, may be defined as a

"prolapse or downward displacement of the stomach, right kidney, or both kidneys, and other organs of the abdominal cavity which may be associated with disturbances of the gastro-intestinal tract and pelvic organs, together with various nervous symptoms."

Normally, the viscera are kept in their proper positions by the abdominal muscles and the maintenance of the normal intra-abdominal pressure, in which the abdominal muscles also aid. Anything causing a loss of tone of the abdominal muscles, such as chronic wasting diseases, or anything causing a change in the intra-abdominal pressure as the emptying of the uterus in childbirth or the removal of a large abdominal tumor may result in visceroptosis. There are three varieties of cases—the congenital, the acquired, and a class, probably the largest of all, in which a congenital predisposition and acquired factors coexist. In the congenital cases there is a constitutional defect present. These cases have a long, narrow thorax, acute costochondral angle and many of them have a floating tenth rib, the so-called "habitus enteroptoticus." The diaphragm and liver are pushed down. Bassler has said that this form of splanchnoptosis is a "status of debility" and "represents to a more or less degree poor tissue soil in early life."

The chief factors in the production of

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the acquired type as given by Kemp are: (1) various skeletal deformities, such as spinal curvature, rickets, kyphosis and kypho-scoliosis; (2) intrathoracic pressure on the diaphragm from effusions, tumor, etc.; (3) intra-abdominal tumors or leukemic enlargement of the spleen; (4) chronic dilatation of the stomach; (5) adhesions attached to movable viscera; (6) compression of the thorax by tight lacing, poor corsets, etc.; (7) relaxation of the abdominal muscles and consequent diminution of intra-abdominal pressure. This latter may result from loss of weight and muscular tone from any cause, as chronic infections, the wasting diseases or the relaxation and decreased intra-abdominal pressure following the emptying of the uterus at time of confinement. This is a most important factor in many of the acquired cases, the ptosis resulting being known as Landau's disease. I am sure you all have seen many cases of visceroptosis in women whose symptoms dated from the time of their first confinement. The stomach, duodenum, colon, especially the transverse colon, and right kidney are usually all involved, though each may be involved alone. The stomach can not be said to be ptotic unless the lesser curvature is below the umbilicus with the patient in the upright position, for in chronic dilatation and other conditions the greater curvature may be well down, while the lesser curvature is in the normal position.

Fairly marked grades of visceroptosis may exist without the production of symptoms, and on the other hand severe symptoms may result from slight ptosis. This is probably a result of the underlying condition and depends, too, on whether or not there is interference with the motor functions of the gastro-intestinal tract. These patients are usually nervous, anemic and complain of being very weak. They often are dizzy, have palpitation and dyspnea on exertion and suffer much from headache and backache. Constipation is the rule. Depression and irritability are commonly present. They usually have a poor appetite and suffer from flatulence and fullness after eating. Many females have dysmenorrhea and many have frequency of urination, especially on standing, with often a sensation of dragging in the lower abdomen, which they describe by saying they felt as if everything would drop out of the abdomen. Gastric analysis may show a normal content, hyper- or hypochlorhydia, or even achlorhydria.

One patient seen by me recently with a movable kidney had a typical Dietls' crisis. The trouble is very often referred by the patient to the kidneys because of the persistent backache. Symptoms may be referable to other organs in the abdomen and there may be neurasthenic pains in various parts of the body. Many patients consult their physician thinking they have heart disease, because of the palpitation and dyspnea with which they suffer.

On physical examination certain well-marked characteristics are present. The ptotic patient is usually anemic and poorly nourished, with, in the congenital type, a long, narrow chest, with a very acute costachondral angle. In a certain small percentage of cases the patients are fairly stout. The abdomen in the upright position is likely to be concave from the umbilicus to the ensiform and protuberant from the umbilicus to the symphysis, due to the fact that the stomach and much of the large intestines are in this area.

The pulsation of the abdominal aorta above the umbilicus can often be seen and usually felt. This is almost pathognomonic of the condition. In many cases, especially those occurring after labor and after the removal of large tumors, there is marked diastasis of the recti. The right kidney can usually be felt and in extreme degrees the whole kidney comes between the palpating hands.

The x-ray, of course, is the most valuable means of recognizing the exact amount of ptosis. This may show the stomach to be any one of the variously described types, as the fish hook, water trap, etc., and many show it to be only slightly ptosed, or may show such an extreme degree of ptosis that it is far down in the pelvis. The transverse colon also may be down in the pelvis and, in marked cases, the right kidney. The x-ray also gives us valuable evidence as to the amount of intestinal stasis that is present.

Very little can be done toward prevention of the congenital type of visceroptosis, and these cases are the hardest to re-

lieve. Much can be done, however, to prevent the acquired type, especially that following confinement. The wearing of proper corsets and attention to the maintenance of nutrition and physical strength following chronic illnesses will prevent a certain number of cases. All patients having the "habitus enteroptoticus" should be carefully watched to prevent the development of symptoms. Their nutrition should at all times be maintained and every effort made to see that their bodily vigor is kept at its maximum.

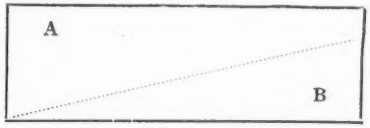
Not many obstetricians realize how much the post-partum treatment can do to prevent Landau's disease. The parturient woman should have a well-fitting abdominal binder applied as soon after the labor as possible, reaching from the middle-third of the thigh to the ensiform. This should be kept up all the time she is in bed and when she gets up a good corset or well-fitting binder applied and should be worn for several months. This gives much support to the weakened, relaxed abdominal muscles during the time they are regaining their tone, and, if generally adopted, would do much toward preventing many cases of visceroptosis. Several weeks after labor light exercise and gentle massage, both of which strengthen the abdominal muscles and improve the general tone of the body, may be begun.

Once the condition has developed, the indications for treatment are to give strength and proper mechanical support to the adominal wall, to increase the amount of fat in the abdominal cavity, and to build up the general condition. The intra-abdominal pressure is raised by strengthening the abdominal muscles and by the accumulation of fat within the abdomen, this latter giving support to the stomach and other ptosed organs. As a general rule, treatment directed along these lines will largely correct the various nervous, gastro-intestinal and cardiac symptoms of which these patients complain.

For purposes of treatment the cases may be classified as (1) those which can be given ambulatory treatment and (2) those which require a preliminary period of rest in bed. The general principles of treatment enumerated are followed in both cases, the mild cases coming within the first class, the severe ones in the second.

Many forms of mechanical support have been devised, but all have the same basic idea that they give most of their support below the umbilicus so that the ptosed organs will be displaced upwards. These supports may be of adhesive plaster or may be especially made corsets or binders. The adhesive plaster support suggested by Dr. A. Rose is one of the best.

"In the selection of this belt the plaster is cut in lengths long enough to overlap across the back. It is then folded end to end and cut from the lowest edge in front to the upper part of the ends of the strip.



(Taken from Bassler.)

This makes three pieces of plaster. Piece A is then applied first by sticking the pointed end as low on the front of the abdomen as possible and then swinging the small ends as tight and as high as possible to lie flat around the body in the rear, one overlapping the other across the back. The lower edges of this piece should not include the crests of the ilea. The lower strips are next applied low from the hypo-gastric region, across the inguinal, over the iliac and across the back over the under piece."

The original strip should be seven inches wide and a yard long. Or a support made of narrower straps, applied obliquely, overlapping in the midline in front and over the spine behind, may be used very satisfactorily. These should extend from the symphysis to the umbilicus and the lower abdomen should be held up while they are being applied.

The advantages of these adhesive plaster supports are that they can be used on very thin people whose scaphoid abdomens could not be supported by a corset or abdominal binder because of the protuberant spines of the ilia. Their disadvantages are that they cause such irritation of the skin that they can not be left on longer than a few weeks. Many men use these for several weeks and follow them with a binder or corset.

"A corset of the proper kind should be long enough to come down over the pubic bone and crests of the ilia, should not come up high on the thorax, and should be loose enough above the um-

bilical line to allow for full play of the lungs and the organs immediately below them, all of which rise and fall with respiration."

All corsets should be made to measure and accurately fitted to the body. In the majority of my cases I have found that a well-fitting abdominal binder answered satisfactorily. I use a linen mesh Storm binder, all binders being made to order. Whether the binder or the corset be used, it should be worn for months, or perhaps several years, until the abdominal muscles have regained sufficient tone to do their part toward maintaining the correct intra-abdominal pressure and giving proper support to the contained viscera. Both binder and corset should always be applied with the patient in the recumbent posture and with the knees flexed, which allows the viscera to reach as nearly as possible their normal position and be held there after the support is applied.

The tone and strength of the abdominal muscles should be developed by massage and proper exercises, descriptions of which can be found in almost all the standard text books. It is not wise to employ these exercises in the early stages of the treatment, for they might have a tendency to reduce weight instead of adding to it, although massage may be employed from the beginning.

The second indication of treatment, namely, the increase of fat in the intra-abdominal cavity, can be met by so-called superalimentation, or forced feeding. The foods employed should have the maximum nutritive value for their bulk and the quantity taken should depend to some extent on the amount of atony present as revealed by the x-ray and other tests. In a case with much atony of the stomach it is better to employ small amounts of food at rather frequent intervals, while with a normally active organ larger quantities can be given at longer intervals. In my personal experience it has not seemed necessary to give much consideration to the gastric analysis in arranging the diet, though some authorities claim that this is essential. In an ambulatory case it is better for the patient to lie flat of his back for 30 to 45 minutes after each meal, especially after the largest meal of the day. Milk and eggs should form quite a large part of the dietary, and in a case with fairly normal motor activity of the gastro-intestinal tract, I usually outline a diet somewhat as follows:

Breakfast — Cereal with cream and sugar; two eggs; bacon; bread or toast and butter; milk, or weak coffee with large amount of cream.

10:00 or 10:30 a. m.—Glass of milk with an egg.

Dinner—Large helping of meat or fish; rice or baked or mashed potato and at least one other vegetable; bread or toast and butter; vegetable salad with olive oil dressing; glass of milk; dessert made of milk and eggs, as custard, pudding, ice cream.

4:00 or 4:30 p. m.—Glass of milk with an egg.

Supper—Cereal with cream and sugar; two eggs; jam, jelly or stewed fruit; bread or toast and butter; vegetable salad with olive oil dressing; dessert, as for dinner, if desired; glass of milk.

Bedtime—Glass of milk.

No soups are permitted and the intake of fluids should be limited, especially at meal time, when not over 8 ounces should be allowed. It is important that the food be chewed well and slowly.

Many of these patients who have suffered for years with flatulence and other dyspeptic symptoms are really undernourished, due to the fact that they have discarded so many articles of food that they have thought disagreed with them. It is often astonishing to find how little they have eaten over a considerable space of time. Frequently it is difficult to convince them that they can take so much food without being made sick, but it is very important to stress this fact in advising them. In the early days of the treatment they often complain of fullness after eating and say they can not possibly take the diet ordered, but it is astonishing to see how rapidly this passes off. It is frequently only a few days before they actually become hungry and impatient for each feeding time.

In cases with a severe degree of gastric atony, these large amounts of food can not be given at first; it is wise to begin with milk and eggs, given at three-hour intervals, other articles of diet being added

gradually as the gastric atony and general condition of the patient improve. The bed cases should remain in bed from three to six weeks, depending on the rapidity of improvement, and in both the ambulatory and bed cases the diet should be adhered to for several months, else the initial benefit may be lost. The lowest weight gained in any of the cases I have treated has been five pounds, the maximum thirty.

After the bed case gets up the treatment should be continued as in the ambulatory case, and it is needless to add that his life should be carefully regulated for a time so that he gets plenty of sleep, fresh air, etc. The abdominal supporter should be used whenever the patient is not in the recumbent position.

In practically all of my cases I employ some form of arsenic, strychnine and iron. There is not much need of medicine, however, except for the relief of special symptoms. Hyper-acidity should be treated with alkalies, hypo-acidity, or achlorhydria demands hydrochloric acid, and sleeplessness, severe nervousness, etc., their appropriate medication. Constipation may be treated by any of the approved methods, including mineral oil, agar, bran, etc., etc.

Surgery has no place in the treatment of visceroptosis, unless it be for the correction of severe symptoms not amenable to medical treatment, as Dietls' crisis, arising from torsion of the pedicle when the kidneys are freely movable or persistent constipation resulting from angulation of the intestines due to kinks, adhesions, etc.

Suggestion plays an important part in the successful treatment of this condition. Most of these patients are nervous, more or less inclined to be hysterical and pessimistic. Many of them, after having gone from doctor to doctor without relief, have almost lost faith in our profession and have become chronic invalids. It is important to encourage them, to convince them that they can be cured, and to change their pessimism to a healthy optimism. Tactful handling, constant encouragement and suggestion from the physician will do much toward this end.

All cases of visceroptosis can not be cured, but about two-thirds can be given permanent relief, the other one-third temporary relief. This means much to a large class of sufferers. The condition is so easily recognized and can be so readily treated that it is a great pity more attention is not paid to it by the majority of the profession. The difference between a case before and after treatment is striking. Most of the nervous symptoms are gone, the patient feels stronger and more energetic, has a better appetite and a more cheerful outlook on life. He can do his work with comparative comfort and is more grateful for his improvement than people with almost any other condition of which I know.

DISCUSSION

Dr. W. A. Dearman, Long Beach, Miss.—In the last few months I have seen some cases of gastroenteritis, visceroptosis and splanchnoptosis, and I know in past years I have failed to recognize a good many of these cases. They were recorded in my history sheet and diagnostic studies as neurasthenics. I make it a rule in cases of emaciated individuals, especially in women, to allow them to stand up and inspect the abdomen, and as a rule I find a sulcus underneath the umbilicus and the abdomen is tense and the intestines are down in the pelvis.

We think of shortening the round ligaments for prolapse of the uterus. We have gastroptosis, enteroptosis and hepatosis. When we have suspended the kidney or the uterus, we think each operation is a specific according to the men who initiated these operations. We find that patients go from one surgeon to another until practically everything in the abdominal cavity is suspended that can be suspended and we have been losing time. I want to say to you that in past years of the cases of prolapse of the uterus that I have referred to the surgeons, 95 per cent came back to me in the course of three or four years with the same condition. Why is it? When we think of the inconvenience and the dangers of an abdominal operation, it seems to me we should try to conserve the interests of those people who come under our observation and care.

I have had half a dozen cases, I presume, in the last six months in which special roentgenological studies were made, and in some, marked visceroptosis was found, while in others the visceroptosis was hardly discernible. I have sent these people over to the instrument house to have a belt made to support their abdomens. I remember a Swede with visceroptosis who wants to put his arm around my neck every time he meets me on the street. In his case I suggested constitutional measures, regulated his diet; I put him on large doses of nux vomica to increase his muscular tone. The relief in his case was very marked. Such treatment will save many cases from operation and give them almost immediate relief.

Dr. Stewart R. Roberts, Atlanta, Ga.—Since Elennard wrote his wonderful monograph on enteroptosis, it has been to us more of a name than a condition that we should face. Particularly in the South is this subject important. Women in the rural districts, who bring forth children with great rapidity, who have perineal lacerations that are not repaired, slowly but surely develop general visceroptosis. Later there is interference with the appetite and the subsequent development of pellagra. I have seen many of these cases among multipara, with perineal lacerations of the second or third degree, particularly of the second degree, with long-standing visceroptosis, loss of appetite and subsequent pellagra.

The first thing the medical man should remember, it seems to me, about visceroptosis is that as a rule it is not an operative condition. The second proposition is that it is a nutritional problem. If it be a woman and there be perineal laceration, the laceration should be repaired, but there should be no abdominal operation. Sometimes in these cases, even, that should be postponed until the patient gains flesh and is built up. I know of no more expressive phrase than the one "built up." It means something. Sometimes after these abdominal operations, when the pellagrous tendency is not realized, the operation will precipitate or hasten a latent pellagra.

I am glad the previous speaker referred to the belt. I have been getting better results by sending these patients to a corset tailoring establishment, particularly the women, and having them fitted with a straight front corset. It comes far down to the junction of the upper and middle-thirds of the thigh and is not too high.

Another thing that is helpful to these patients is large quantities of fruit, and I want particularly to call attention to nux vomica that the doctor very wisely referred to. Not many drugs are of much service, but since Musser began to give tincture of nux vomica in large doses and Cabot followed him, it has come to be realized as one of the really great drugs.

I give the present strong tincture of the new pharmacopeia, as much as thirty drops, three times a day, after meals. I have seen some of my medical friends give as much as ninety drops of the tincture of nux vomica three times a day without disturbance. I should not recommend such doses, but beginning with ten and fifteen drops and going up to twenty-five or thirty is of value. It does increase the general muscular tone, although I am not prepared to admit it is a cardiac stimulant. Some of these cases never improve until they are put to bed and given forced feeding, particularly with cream, milk and eggs. A third practical point arises here. A slender, emaciated person, particularly one after childbearing, can be made to gain from ten to fifty pounds by putting her to bed and giving her three meals a day. First, they have nothing to do with what is brought them. We usually look after them. Second, it is their part to swallow, and if they swallow it will go down, whether they want it or not, and surely we both can rejoice in the results. We can give these patients six to eight glasses of sweet milk a day or in twenty-four hours and as many fresh eggs per day, or more of both.

Dr. Allan Eustis, New Orleans, La.—I did not expect to discuss this paper, but it covers a question which is of such importance to the general practitioner that I can not allow certain statements to pass unchallenged. I think that we often make a mistake in discussing a subject like visceroptosis when we make a broad statement that it is never a surgical condition. I have been especially interested in visceroptosis, as many of you know, and I can state positively that certain cases of visceroptosis are essentially surgical. There are a large number of these individuals in whom the colon is so low that no form of abdominal supporter is able to have any influence on the ptosis. Any form of belt will simply push the colon back into the pelvis, as I have seen quite often when skiagraphs are taken after an opaque meal with the belt in position.

It is all very well to advise putting them to bed and feeding them up, but again a great number are laboring people and first of all are unable to spare the time for a rest cure and are often unable to secure good milk, much less cream. These particular types of visceroptosis have done better after operation, but the results will depend upon the surgeon and the type of operation performed. I can say this frankly, as I do no operating myself, and am in a position to judge the results of the several surgeons operating upon my cases. The best results have been in those cases in which the entire cecum and ascending colon have been removed and the terminal ileum anastomosed with the hepatic flexure, but this is a formidable operation and not to be undertaken by one inexperienced nor lightly to be recommended. It is only after all other methods fail that surgery should be resorted to.

As regards the diet, we often make a mistake when we simply say "feed these patients," and I differ with Dr. Roberts in advising that they be forced to eat whether they want the particular article of diet or not. We get better digestion and absorption of nutritive material if the patient is eating something he likes than one for which he has a disgust, and especially is this true of milk. Milk in certain cases is well borne, but in my experience buttermilk is better digested, and its caloric content can be raised by adding cream and sugar of milk. Dr. Wilkerson advocates giving meat. In these cases most of the subjective symptoms are due to absorption of intestinal toxins and the tendency to develop them must be constantly guarded against. Meat, therefore, in my opinion, is contraindicated. It is a mistake that is very prevalent to consider eggs and meat as fattening food. Carbohydrates and fats are the fattening foods and should form the greater part of all cases of visceroptosis.

Dr. John W. Scott, Lexington, Ky.—In advocating concentrated foods in this condition one loses sight of the great importance of foods leaving a considerable undigested residue, the so-called "fodder" foods, the "roughage" of stockmen.

Attention has been called to the important part played here by stasis of the intestinal contents; it seems to me that a diet consisting largely of cream and eggs and meat with its low residue, high protein and acid ash will not only

promote such stasis, but add to it a very troublesome acid intoxication.

Vegetable foods such as cauliflower, spinach, asparagus, potatoes, green peas and also the stewed fruits are, I believe, a very necessary addition in order to balance the high protein foods advocated by the essayist.

As Dr. Eustis has said, the pig is fattened on corn, but we do not make the mistake in feeding the pig that we make in feeding ourselves, of separating from the grain all of the husk. We do not feed him patent flour. Highly concentrated food must be balanced by food of large bulk and low nutritive value.

Dr. Wilkerson (closing).—My reason for reading this paper was to bring to the attention of the men in general practice this subject and get them to pay more attention to it, and to recognize the condition or conditions more frequently than they do now. These people can be treated by any physician; the vast majority of them can be relieved as successfully in the country as in a good hospital, and there are thousands of women who would be better off if the medical man would be a little more careful and a little more particular in recognizing and treating this particular condition.

COMPARATIVE STUDY OF GASTRIC MOTILITY AS DETERMINED BY THE ORDINARY TEST MEAL AND SIX-HOUR BARIUM RETENTION*

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and
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Secretion, motility and absorption are the chief functions of the stomach. From a clinical point of view the motor function is the most important; the secretory stands second, while that of absorption plays a comparatively unimportant role. Since the introduction of roentgenological methods of diagnosis, disturbances of the motor function of the stomach have assumed much more clinical significance. No gastrointestinal examination is complete without determining this function.

Numerous methods have been devised for the determination of the motor function. These may be grouped under three general heads:

1. Those which depend upon the application of the stomach tube with the use of a test dinner, test supper or test breakfast.

2. Indirect tests which consist of introducing into the stomach substances insoluble in acid gastric juice, but soluble in the alkaline intestinal media, where they are split up into simpler substances which can be recognized by tests in the excretion.*

3. Roentgenological methods: fluoroscopic and radiographic.

Although the x-ray has practically supplanted all of the indirect methods, the test meal is still considered the best by some of the greatest authorities. The oldest method is that of V. Leube,[1] which consists in washing out the stomach six or seven hours after a large meal (dinner).

Various test suppers have been advocated which include, among other foods, such articles of diet as rice, cranberries, raisins, currants, etc. The stomach is washed out in the morning to ascertain if any of these articles remain as residue. The Ewald test breakfast has been used for the same purpose by washing the stomach within two hours when it should be emptied, if the motility is not impaired.

The regular technic of an ordinary test breakfast has also been employed. This method is the most desirable and practical, in as much as both secretory and motor functions can be determined at the same time, and with one introduction of the stomach tube. However, two difficulties encountered in all the former methods, as suggested by W. Wolff, had to be overcome, namely:

1. The difficulty of removing the contents absolutey without residue.

2. The inability of determining in what proportion the food residue and the gastric secretions exist in gastric contents obtained.

It is therefore clearly evident that any method devised to completely empty the stomach of its contents will remove both objections, and make it possible to determine accurately both the secretory and motor functions by the usual test meal.

This can readily be accomplished by a method introduced several years ago by one of the writers,[2] which consists of aspirating the stomach contents by means of a partial vacuum apparatus.

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*Read in Section on Medicine, Southern Medical Association, Thirteenth Annual Meeting, Asheville, N. C., Nov. 10-13, 1919.

*(a) Ewald and Siever's salol test.
(b) Fleisher's iodin test.
(c) Winkler and Stein's iodipin test.

Since the introduction of Kussmaul's stomach pump, which is now of historical interest only, numerous methods and devices for aspiration and lavage have been in vogue. These comprise the Ewald and Boas bulbs, Friedlieb apparatus, Strauss apparatus, aspirating bottles, simple expression, etc. All these methods lack two salient features:

1. The ability of applying continuous suction.

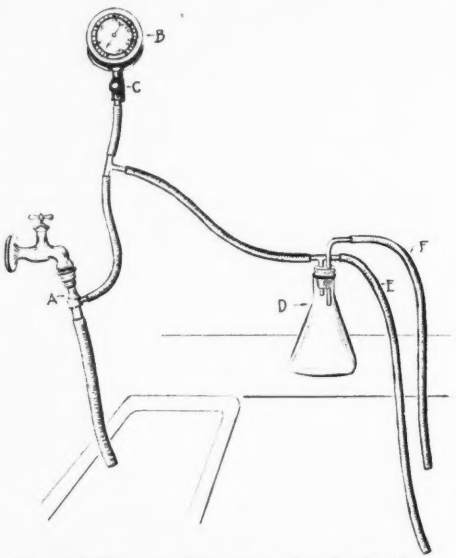
2. The means of graduating the amount of suction employed.

Gross[3] in 1893 was the first to attempt to meet the latter requirement by attaching to a small stomach tube and a modified Politzer bag a U-shaped mercury manometer. This proved impractical, because the apparatus was too cumbersome, and a uniform degree of suction could not be satisfactorily obtained with an aspirating bulb.

The apparatus used in our clinic consists of a filter pump connected by means of heavy rubber tubing with an ordinary vacuum gauge to which is attached a specially constructed valve for adjusting the degree of vacuum. Uniform and continuous suction to any degree desired, as expressed in inches of mercury, can thus be obtained. The water spigot serves for coarse adjustment, the valve designated as the vacuum regulator for fine adjustment as well as for a safety device, which makes it impossible to exceed the amount for which it is adjusted. For withdrawing stomach contents an ordinary wash bottle (500 c.c. Erlenmeyer flask) is attached with heavy tubing to the apparatus which is set for a vacuum of five inches of mercury. A large size stomach tube (38 French) is connected with the wash bottle and also a piece of rubber tubing of sufficient length for one end to rest on the floor. Suction is started after the stomach tube is introduced by compressing the tube on the floor with the foot; it is released by removing the foot. Thus both hands are free to manipulate the tube.

The test meal employed is the one in use at the Mayo Clinic. It consists of six "Arrowroot Biscuits," a glass (200 c. c.) of hot water and an equal amount of cold water. The "Arrowroot Biscuits" have the advantage of being palatable, uniform in weight, and always thoroughly disintegrate in the stomach, which is a matter of considerable importance for completely emptying the stomach. The test breakfasts are always given to the patients in the office and the time, until they are removed, is carefully recorded. The stomach is thoroughly washed out after aspirating the test meal in order to determine whether it has been completely emptied.

To patients with a history suggesting retention, a supper consisting of broth, steak or lamb chop, potatoes, and a roll is given the night before and one hour later a dozen or more seedless raisins.



Partial Vacuum Apparatus for Aspirating Stomach Contents

A—Filter pump.
B—Vacuum gauge.
C—Vacuum regulator.
D—Collecting flask.
E—Rubber tube to floor for controlling suction with foot.
F—Stomach tube.

These are always searched for as residue in the stomach washings, after the removal of the test meal the next morning.

Comparing the results of 100 consecutive test meals removed by the expression method or with the use of a Boas bulb with 100 consecutive test meals removed by the partial vacuum method, the figures show that with the former method the average content removed was 86 c. c., and the aver-

age time for the meal was approximately 45 minutes, whereas with the latter method the average content removed was 92 c. c., and the average time for the meal was approximately 51 minutes.

If allowance be made for the difference of time the contrast between the two methods is more striking. In a series of over 100 examinations the fifty-minute meals averaged 27 c. c. more than the sixty.

TABLE I—DUODENAL ULCERS

No.	Test Meal Min.	Amount C. C.	Six-hour Retention	Acidity Free Total
1	60	130	Small	76–92
2	50	70	0	4–18
3	60	50	0	70–90
4	60	110	Large	76–88
5	60	60	0	32–58
6	60	115	0	44–62
7	60	70	0	40–60
8	60	130	Medium	36–56
9	50	100	0	42–54
10	60	190	Small	48–60

The normal emptying time of the stomach is about two hours. It has been estimated that a stomach with normal motility should not contain more than 100 c. c. one hour after the usual test breakfast.

For retention studies both fluoroscopic and roentgenographic methods were employed. The barium meal which we have used is easily prepared and is quite acceptable to the patient. It consists of barium sulphate four ounces, contents of six-ounce can of unsweetened evaporated milk, two teaspoonsful of Mellins' food, and water to make one pint. It makes a smooth emulsion and gives a shadow of equal density throughout.

In our series of 102 cases studied for six-hour barium retention, 41 cases had the test meal removed in fifty minutes with an average of 107 c. c. contents and 61 in sixty minutes with an average of 80 c. c. contents. The fifty-minute group gave an average of 139 c. c. for the retention and 100 c. c. for the non-retention cases. The sixty-minute group had an average of 110 c. c. for the retention and 66.5 c. c. for the non-retention cases.

In undertaking this study we had hoped to establish some relation of the motor function of the stomach as determined by the complete removal of the gastric contents after a test meal in a given time, with six-hour barium retention. On the whole the results have been disappointing, although at the beginning of our observation it did appear as if there was a fairly constant relation between the amount of gastric contents after a test breakfast and six-hour retention. Further observations, however, have led us to change our view as to any constant relation between the two. This is probably due to other factors than pathological which influence the motor function, such as the psychic disturbance associated with an examination and the mechanical stimulation in passing a stomach tube causing spasmodic contraction.

TABLE II—GASTRIC ULCERS

No.	Test Meal Min.	Amount C. C.	Six-hour Retention	Acidity Free Total
1	50	200	Small	30–50
2	60	50	0	22–34
3	60	70	0	72–80
4	50	240	Large	36–56
5	50	25	Small	50–60
6	50	40	0	34–58
7	50	110	0	64–78
8	60	120	0	45–56
9	60	30	Medium (Hour-glass)	20–40

The disparaging results were due to the fact that in one instance six-hour retention occurred with 25 c. c. gastric contents in fifty minutes, and in another instance there was no six-hour retention with 230 c. c. gastric contents, although the latter patient had some duodenal retention. However, excluding this case, our experience shows that six-hour retention occurs in all cases in which the stomach contents exceed 200 c. c. in fifty minutes or 150 c. c. in sixty minutes.

In certain groups of cases, data has been derived which seems to be of some clinical significance.

In ten cases of achylia gastrica retention occurred in only one case and this was accompanied by marked gastroptosis with atony, although in certain cases the amount of gastric contents were much above normal. Gastric carcinoma with stenosing lesions are not included in this group.

TABLE III—ACHYLIA GASTRICA

No.	Test Meal Min.	Amount C. C.	Six-hour Retention	Acidity Free Total
1	50	20	0	
2	50	190	0	
3	60	20	0	
4	50	150	Medium	
5	60	6	0	
6	50	30	0	
7	55	120	0	
8	50	50	0	
9	50	100	0	
10	60	10	0	

In a group of 10 cases diagnosed as active duodenal ulcer no six-hour retention occurred in any case with less than the normal hour limit of 100 c. c. Retention occurred in all cases except one with more than 100 c. c. There has been greater uniformity of results in this group than in any other which is in striking contrast to those obtained in gastric ulcer. In a series of nine cases six-hour retention occurred in four: two had 200 and 240 c. c. gastric contents, respectively; the other two had 25 and 30 c. c.. One of them was definitely due to hour-glass contraction and the other could not be accounted for.

Adhesions on the right side of the abdomen, involving the pylorus and duodenum, are common and form an interesting group. Six-hour retention occurs most frequently in this group, being present in ten of nineteen patients.

In one-half of the six-hour retention cases the motor function at the beginning of digestion was either normal or above normal, as indicated by the fact that the stomach one hour after the test breakfast contained small amounts of 40, 45, 50, 60 and 70 c. c., respectively. The case with 40 c. c. had considerable six-hour retention. The adhesions were of gall-bladder origin and the patient suffered with chronic cholecystitis. The next case with 45 c. c. suffered with gall-stones and adhesions, as confirmed by operation. She had hour-glass contraction with small six-hour barium retention. In several of these cases it was noted fluoroscopically that the stomach emptied rapidly at first, although the six-hour plate still showed barium in the stomach.

TABLE IV—PYLORODUODENAL ADHESIONS

No.	Test Meal Min.	Amount C. C.	Six-hour Retention	Acidity Free Total
1	50	200	Medium	25–38
2	60	35	0	54–68
3	50	50	Small	24–38
4	60	100	0	20 30
5	60	110	Small	26–40
6	60	105	0	68–88
7	60	45	Small	66–88
8	75	100	Small	30–46
9	60	140	Medium	20–34
10	60	40	Medium	22–38
11	60	116	0	74–94
12	50	120	0	75–93
13	60	60	0	22–36
14	60	60	0	26–46
15	50	30	0	34–44
16	50	70	Small	6–36
17	50	120	0	38–50
18	60	160	Small	22–40
19	60	60	Small	54–76

These observations indicate that frequently in adhesions involving the pylorus and duodenum the power of the stomach to empty itself is at first increased and later diminished.

The degree of gastric acidity seems to have little or no influence upon the amount of gastric contents after a test breakfast or six-hour retention. No interpretation

should be made on this point without studying the acid curve by the Rehfus method of fractional gastric analysis.

A discussion of the motor mechanism of the stomach and the factors influencing this function has been purposely omitted, since it does not come within the scope of this paper.

The results of these studies may be summarized as follows:

1. The motor function of the stomach can be determined by the complete removal of a standard test meal with the partial vacuum method.

2. There is no constant relation between the motor function as determined by the test meal method and six-hour barium retention.

3. Six-hour barium retention occurs after a motor meal if the stomach contents exceed 200 c. c. in fifty minutes, or 150 c. c. in sixty minutes.

4. The comparative results of the two methods are most uniform and constant in duodenal ulcer.

5. Six-hour barium retention occurs more frequently in adhesions involving the pyloro-duodenal region than in either duodenal or gastric ulcer.

6. There is very little evidence to show that the secretory function has any influence on the motor function in pathological conditions affecting the stomach and duodenum.

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3. Gross: Therapeut. Monatsh., 1894, No. 12.

DISCUSSION

Dr. S. K. Simon, New Orleans, La.—Dr. Beck has brought up a very valuable and practical point, and one that probably every one of us has had occasion to note in the course of clinical experience, and that is the discrepancy that exists between the test meal motility and the results of fluoroscopic or roentgenological studies of the gastric motility. The cause of this has been debated pro and con a bit in the past. Ever since Goldston's studies on gastric motility we have had a clearer insight into the mode of action of the gastric musculature. Since that time very important contributions have been made to this subject by Dr. Mills, of St. Louis; Dr. Franklin White, of Boston, and also Cannon, of Boston.

There is one thing in trying to understand the discrepancy in gastric motility by any test meal and the x-ray results. Gastric peristalsis is not synonymous with gastric motility. We often see, especially in duodenal ulcer, a sudden desire on the part of the stomach to empty itself rapidly just after the barium meal has been swallowed. There is a rapid emptying of the stomach and a very perceptible slowing down of the gastric musculature, so that the motility, although it starts off with a rush, may at the end be perfectly normal; that is, the stomach may take its full allotted time of six hours to empty itself. In that case there is increase or hyperstalsis produced immediately by the presence of the barium meal in the stomach and by the swallowing of food, so that in the earlier phase of digestion the stomach empties itself very rapidly, but for some reason loses that excitability and settles down to more normal motor functioning.

The barium meal is not a normal meal, and that might be one of the causes of discrepancy. Barium itself is a rather heavy substance and tends to gravitate to the lower part of the stomach, and probably gives the gastric musculature a great deal more difficulty in getting rid of it in the intestine than the ordinary food substances that are taken, or the substances which compose the average test meal, such as bread and water and other preparations. That might account in some way for the discrepancy.

There is another factor involved which engages my attention, and that is the secretory function of the stomach in connection with motility. I am firmly of the belief that there is a hypersecretion entirely independent of motility. Of course, in all delayed motility there is necessarily a hypersecretion because the gastric juice is secreted as long as there is food present in the stomach and only ceases when the stomach is entirely emptied of the food. Under certain circumstances, independently of the kind or amount of food, there is an oversecretion of the gastric juice. It is largely a reflex state dependent upon ordinary reflexes or neurological factors, and in those cases in which there is an excessive secretion of gastric juice the motility is delayed with the stomach tube, but the x-ray may show a normal emptying power. That type of discrepancy has impressed me frequently: gastric hypersecretion, the stomach tube showing after the ordinary test meal a very large amount of contents made up largely of gastric juice, while the same patient undergoing fluoroscopic study will show complete emptying of the stomach within six hours.

Dr. A. L. Gray, Richmond, Va.—My work is exclusively roentgenology, and when I get these cases I find they have gone the rounds not only of the general practitioner or family physician, but also of the gastroenterologist or surgeon. The remarks I am about to make will be from the standpoint of the roentgenologist only.

So often the cases that are referred to me are regarded as having had so much retention after a test meal. I have found, as these gentlemen have stated, in the absence of an organic obstruction at the pylorus, there is very little relation between the emptying time of the test meal and the emptying time after the barium meal. In our efforts to arrive at any definite conclusion in x-ray examination of the alimentary tract, it is absolutely necessary to adopt a definite technic. We can not expect to obtain the same results with a meal of barium and water, or barium and mucilage solution, as we expect from barium and a custard, or barium and Bulgarian buttermilk. Especially should we not expect the same results after meals of varying sizes. Until roentgenologists throughout the country adopt a standard meal we must of necessity get variations in our results. The meal that I use is entirely different from the one reported by Dr. Beck. The simplest meal that I can get that is palatable is the one that I prefer. I mean, of course, palatable to most individuals. That is Bulgarian buttermilk, not ordinary buttermilk, because it is too thin. Occasionally you get good thick buttermilk, but as a general rule ordinary buttermilk is entirely too thin and will not suspend the barium for any length of time. This Bulgarian buttermilk, if properly made, is nearly always about the same consistency, and it contains all of the proximate principles of food. After having decided on a definite sized meal, with a definite sized dose of barium sulphate, which in my personal technic is from two to four ounces, depending upon the size of the patient, you may expect, after giving this meal, to obtain a definite emptying time in a perfectly normal stomach under certain definite conditions.

One thing that has not been brought out is the difference in the emptying time due to psychic influences and to postural conditions. If a patient is kept in bed lying on the right side, the emptying time will be much more rapid than if the patient is kept in bed lying on the back. In order to obtain these relations between the test meal and the barium meal, we should have our patients in practically the same condition both psychically and posturally. I am inclined to think that perhaps testing the motility of the stomach under a test meal is just as valuable as it is under a barium meal, but for the sake of comparison we should have these things under exactly the same conditions.

Dr. Beck (*closing*).—In regard to the motor meal to which Dr. Gray referred, we recognize the fact that no motor meal has become definitely standardized, although in our series we use practically the same meal and technic throughout. The studies were made under the same conditions and in the same laboratory, as all the patients were examined in our private clinic and none of them were bed patients. Thus the postural factor has been eliminated.

THE PRESENT LIMITATIONS OF THE ROENTGEN RAY IN THE DIAGNOSIS OF GASTROINTESTINAL DISEASES*

By George M. Niles, Ph.G., M.D.,
Atlanta, Ga.

The title of this study must necessarily be accepted in a qualified sense, for some of the limitations of today may be soon removed. Furthermore, there enter into the question both the personal equation of the investigator and the degree of thoroughness and painstaking effort expended upon the problem at hand.

The roentgen investigation of various gastrointestinal disorders has won an assured position in the diagnostic field, so that no gastroenterologist would now have the temerity to disregard its worth or deride its constructive aid. Roentgenology has displaced no previous clinical methods nor attempted to minimize their value. In early cancer of the stomach, in most of the ulcerative, malignant or organic lesions of the alimentary tract, in incipient tuberculosis of the lungs, manifested mainly by digestive disturbances, and in misplacement of the abdominal viscera, its assistance is direct and positive. There are, however, certain pathologic states where the roentgen examination affords either no sure information, or what it does demonstrate must be by indirection or inference. It is just as well that we admit this, for as much harm may be done by unwarranted as by faulty diagnosis.

GALL-STONES AND GALL-BLADDER PATHOLOGY

This is one of the most serious limitations. It is almost impossible to show a pure cholesterin gall-stone; and the chance of showing the stones at all depends on their chemical constituents, their covering or their density. If many plates are taken, with varying penetration, the chances are more in favor of showing definite shadows than when few are taken. In one of my cases there were 24 plates taken, and while 23 were as bare as the desert of Sahara,

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the ardently sought-for stones appeared clearly in one. There remains, however, the lamentable fact that failure to demonstrate gall-stones by the x-ray does not negate their presence, and my conviction is that with our present technic there are 35 or 40 per cent of gall-stones undemonstrable by the most intelligent effort.

It is a fairly well-accepted fact that a normal gall-bladder can not be made visible by the rays, and when this viscus is moderately infected, when there is neither infiltration nor thickening of the walls, it can not be clearly shown. There are generally some pericholecystitic adhesions which mar the smooth contour of the duodenal cap, or the cap may be pushed over to the left, thus affording inferential information, but the gall-bladder itself can not be made apparent unless considerably thickened or infiltrated.

SOME GASTRIC ULCERS

Those ulcers near or invading the pyloric outlet of the stomach, those on the lesser curvature, or those which carry considerable scar tissue at their bases, can generally be demonstrated without great difficulty. Some of those, however, which have produced but little local deformity, or are situated around the greater curvature or lateral aspect of the stomach, are indeed hard to show. By obtaining many views of the stomach in various positions—erect, prone, oblique and lateral, most of the stomach contour may be brought out. One eminent gastrointestinal roentgenologist avers that an ulcer should be demonstrated, no matter what its position or how shallow the erosion. To this end he takes from 40 to 75 plates of the stomach. With due respect to his statement, I must contend that perhaps 10 per cent of small gastric ulcers situated as mentioned can not be definitely and convincingly demonstrated.

CANCER OF THE LIVER

Unless this has so involved the surrounding structures as to exhibit deformity of the pylorus, duodenum, or jejunum, or by the appearance of adhesions in the right upper quadrant of the abdomen afford inferential knowledge, the x-ray can not *per se* offer a positive diagnosis.

PANCREATIC PATHOLOGY

The positive diagnosis of material pancreatic disease is a *bete noir* to the earnest clinician. "O wad some power the gift to gie us" to discover a satisfactory technic which would be of real aid, or some analysis of plates to clear up the murky atmosphere of this vexed subject. Dr. Lewis Gregory Cole claims that the curve of the duodenum as it leaves the pylorus and tends upward and downward is somewhat magnified in the presence of pancreatic enlargement. This increased curving I have noted in a few instances where later exploration revealed an abnormal pancreas, but unfortunately this has not been uniform. One case in particular where malignancy of the pylorus was correctly diagnosed in advance showed on operation extensive involvement of the pancreas, but nothing in the roentgen examination offered a clue to this.

THE APPENDIX

Whether or not the appendix can be shown depends both on its position and the penetrability of its lumen. When it is post-cecal, or bound around by adhesions, or when its lumen is completely obliterated by angulations, post-catarrhal inflammation or fecalithis, it is invisible. Sometimes by manipulation under the fluoroscope it can be brought into view and its mobility or fixation clearly demonstrated; also by the appearance of the cecum some information may be obtained, but to assert that by a roentgen examination alone the presence or absence of appendiceal pathology may be established would be fallacious and unwarranted.

EARLY CANCER OF THE SIGMOID

In this location it is entirely possible for a malignant infiltration to be hidden by an overlapping coil of gut. The twenty-four-hour plate, the colon injection and the most careful fluoroscopic inspection may fail to disclose an early deformity here—one that in other portions of the large intestine might be clearly delineated. Later and more pronounced deformity can, of course, be readily demonstrated, but by that time clinical symptoms are progressing apace, and perhaps a palpable tumor is in evidence.

These are in the main some of the clear-cut limitations of the roentgen ray in the gastrointestinal problems that come before us—they are real and tangible.

The more common limitations, however, and, by rights, removable ones, relate to superficial examinations, half-baked analyses of the roentgen findings and interpretations based upon insufficient experience. The roentgenologist is not always to blame for the first. When a patient is referred for an examination bringing a letter in which he is instructed "to take a plate of the stomach" and send a complete report thereof, or is admonished that the patient will pay only a nominal fee, how can it be expected that a thorough and illuminating investigation will be obtained? Thus handicapped in advance, what should be the attitude of the roentgenologist? He can not in justice to himself enter into a time-consuming and expensive investigation when the patient has been led to believe that but little was required both as to effort or expenditure. If the referring practitioners would notify these patients that a proper examination would require both time and a fair compensation for the investigator, many of the economic limitations would be automatically removed. Illustrative of this there recently came into my office a prosperous farmer from a village about a hundred miles from Atlanta, who wished me to diagnose an obscure digestive complaint from which he had suffered for several years. He had been informed by his home physician that a single "picture" of his stomach would clarify the situation; that one or two hours would be sufficient time, and was warned not to pay over ten dollars for the complete examination. This man needed and was amply able to pay for a thorough study of his case, and no doubt would have been entirely willing to spend both the necessary time and money had his mind not been warped in advance. This is rather an extreme instance, but gastroenterologists who do their own x-ray work will readily recognize this situation and others approaching it. Objects of charity should receive our sympathetic aid, and people in limited circumstances are entitled to reasonable concessions, but those who are able to pay a decent fee should be notified that a roentgenologic examination is no touch-and-go affair and that it will cost something when properly done. Until the profession at large is educated up to the necessity of completeness and thoroughness in this fruitful field of diagnosis, there will be perforce an artificial limitation to the best efforts of the roentgenologist.

The second removable limitation can be overcome by more careful and thoughtful study of fluoroscopic findings and plates. Some of the fluoroscopic examinations I have witnessed have been performed with such celerity and lightning-like rapidity that it was not humanly possible for the eye or mind to grasp the meaning of the various shadows cast upon the screen. I remember in one clinic in a large hospital in the middle West, seeing 28 patients "run through" the fluoroscope in 45 minutes. This included brief notes dictated to the stenographer as the victims were catapulted along. No matter how expert the examiner or acute his eagle eye, some worth-while details are sure to escape attention. Now that Coolidge tubes are almost universally in use, there is no longer any excuse for undue haste and fluoroscopy possesses a definite function that should be utilized with care and deliberation. Also to obtain from plates all the information they contain requires attentive study. On more than one occasion I have missed some data contained in plates, and, after surgical information was given me, have, on closer inspection, seen points that should have been recognized at first had my study been more earnest and thorough. Well-made plates generally contain a mine of valuable knowledge if it is but intelligently brought out. As to interpretation, that is perhaps the crux of the whole situation. It is the foundation stone to the whole diagnostic edifice. Without correct and intelligent interpretation all else is null and void, and it is "up to" each student and practitioner of roentgenology to remove by his own efforts this limitation up to the boundary line of human fallibility. Let us hope that in the not-too-distant future our roentgenologic horizon may so expand, and that we may so grow in more exact knowledge that these limitations I have endeavored to briefly cover will be entirely swept away.

DISCUSSION

Dr. Marvin H. Smith, Jacksonville, Fla.—Having come into prominence recently, the x-ray is one means of diagnosis that we usually put forward almost in the beginning of our study of a case. A very prominent man said some time ago that we should in every study and investigation do everything possible to arrive at a diagnosis before resorting to the x-ray or the fluoroscope, and this appeared to me to be a very sensible plan. It is a matter that I think our brother physicians in general practice should keep before them, that this idea of two or three x-ray pictures revealing the whole story in a gastrointestinal ailment is a fallacy. Quite frequently, as Dr. Niles stated, laymen come to our laboratory and ask for a picture of the stomach, but we never accept a patient with this understanding, for we tell the individual that we are not conducting a photograph gallery, but that we look upon the x-ray as a link in our chain of evidence and that by its use we gather information not so readily obtainable in other ways.

Dr. W. O. Nisbet, Charlotte, N. C.—I find in my work there is a tendency on the part of the referring physicians to rely entirely upon the x-ray findings for diagnosis. The patients are sent to the roentgenologist for diagnosis. We know that many of these cases can be cleared up by the x-ray findings, but we should all insist that there must be careful and thorough examination, as Dr. Niles claims at the outset of his paper. We must have the bacteriological findings and we must make a careful physical examination.

It has been stated that an expert roentgenologist can diagnose 90 per cent of the cases that come to him. I do not believe this unless it would be some man like Cole, of New York. Without knowing something of the microscopical findings, some of history, without making a physical examination, I do not believe that the plate findings will diagnose 90 per cent of the gastrointestinal cases that come to the roentgenologist.

One point Dr. Niles did not bring out is that a lesion in the fundus of the stomach is very difficult to make out; also a small lesion in the posterior wall of the stomach.

We will all agree that in gall-stone pathology the radiographs are very disappointing. That is a portion of our work in which we need differentiation very frequently, and I do hope the day will come when we will get some assistance from the x-ray.

In connection with appendicitis many interesting problems come up, and I would enjoy hearing the opinions of the different gastroenterological men present here as to the proper interpretation to be put on an open appendix. If the radiograph reveals an open appendix shall we insist on operation or shall we simply recommend operation? My rule is that unless there are associated clinical symptoms pointing definitely to a chronic appendicitis, and unless there is a clear-cut history of prior attacks of appendicitis, I do not recommend operation on finding simply an open appendix.

Another point I would like cleared up is when cancer begins and when ulcer ends. Of course, we can not hope that the x-ray will clear that up. It is just in these cases that we must rely very strongly on bacteriological and clinical findings.

Dr. Max Einhorn, New York, N. Y.—With regard to gall-stones, Dr. Niles felt that 35 per cent are missing; that we can not recognize them. From my experience I would make it a higher percentage; I would say about 75 or 80 per cent. But the trouble is that even if the stones are demonstrated by the x-ray sometimes there are mistakes. I mean that the x-ray shows stones in the gall-bladder and you operate and there are no stones. I had several such cases.

As long as Dr. Niles has mentioned the diagnosis of cancer, I had a patient of that sort not long ago. She came in extremely jaundiced; she had lost fifty pounds, and in order to complete the picture we had an x-ray taken by a roentgenologist of the Lennox Hill Hospital, and he reported the gall-bladder full of stones. I looked at the plate and I saw stones, as I thought, and I had to make a diagnosis of obstruction due to gall-stones on account of the x-ray findings. Personally, I would simply have said there was complete obstruction of the common duct and that was all. I was inclined to think of malignant disease. I recommended operation in order to establish communication between the gall-bladder and the intestine. The operation was done and no trace of stones found in the gall-bladder; nothing but a small, normal gall-bladder. But she had cancerous tumors in the liver and one of these little tumors entirely occluded the hepatic duct. That was recently. I told the x-ray man about it, but there was no explanation. That was of great importance, because when he said stones in the gall-bladder I took it as truth. Probably that tumor mass gave a shadow which was taken for stones.

Another type I would like to mention is that sometimes a duodenal ulcer is diagnosed by means of roentgen rays where an ulcer does not exist. A case I would like to mention was a doctor in New York, a very prominent physician, who had been my patient years ago and recently came back again. He said he had an x-ray made and a dignosis of duodenal ulcer was made due to deformity of the cap. I examined him again and made a string test, which was negative. The question was, is the pylorus permeable? I gave him the pyloric dilator and next morning I could get a big balloon through the pylorus; the string was free. My diagnosis was that there was no ulcer and no lesion of the pylorus. He was very anxious about himself and was taken to the Mayo Clinic and Dr. Mayo operated on him and his appendix was taken out, but the duodenum and pylorus were found normal. Here the x-ray findings were positive as to duodenal ulcer, and still, after a thorough investigation, I came to a negative conclusion.

Another point is that cardiac ulcers are more difficult to recognize by the x-ray. Formerly it was believed that cardiac ulcers were very rare. By the string test I found them rather frequently, but I was in doubt as to whether I was right. I personally was of the opinion that the string was correct, and I got good results by treatment. But Dr. Sheehan, of the New York Post-Graduate,

who is an expert in the use of the bronchoscope and the esophagoscope, read a paper not long ago on ulcers of the cardia as seen by the esophagoscope. He had twenty-seven cases, all sorts of cardiac ulcers seen by the esophagoscope, and he tells me that in all of these he had x-rays taken and made the string test. In 85 per cent of cases of ulcer he got a positive string test corresponding to the location of the ulcer. The x-ray findings there were of so little value that he could rely upon them only in special lines. The x-ray findings are usually negative in that locality. You can see these ulcers; you can demonstrate them by the esophagoscope, and he treats them by local cauterization.

Personally, I am a great believer in the x-ray, and in most of my cases I have an x-ray taken to complete the diagnosis, but it is only a link in the chain of evidence, as some one has said. I am also of the opinion that the x-ray man who takes these pictures should not be told beforehand anything about the clinical findings, because he is usually prejudiced. The physician who sends the patient should determine what should be done—he should tell the x-ray man to examine the appendix, the stomach or the duodenum. I had a case where the x-ray diagnosis was obstruction of the pylorus, while I knew we had to deal with a dilated esophagus and cardio-spasm. That man afterwards died of perforation of the esophagus.

But what the clinician should do is to tell the x-ray man what to do, direct him in the line or field of investigation. He should not tell him right away, "There is duodenal ulcer; take an x-ray." It is all right to guide the roentgenologist, but I would not tell him too much. In making our conclusions we should be as impartial as possible.

Dr. Julius Friedenwald, Baltimore, Md.—In a paper presented at the last meeting of the American Gastroenterological Association, Dr. F. H. Baetjer and I discussed the advantages and limitations of the roentgen ray in the diagnosis of gastrointestinal affections. We also drew attention to the fact that while the x-ray is of the greatest diagnostic help in solving difficult problems in gastroenterology, that there are limitations as to the conclusions which may be drawn from this method of diagnosis, and indeed in a number of instances the results may even be misleading. This is not due, as has been pointed out, to the fact that the x-ray is of the greatest value in revealing ulcers, and yet in some instances these lesions are not found by this method of examination, or defects may be present which are interpreted as ulcers, and which are not found to be so. The same difficulties may arise in regard to the diagnosis of gastric cancer, cholelithiasis, appendicitis or other abdominal conditions. However, while we maintain that the x-ray is of the greatest aid in diagnosis, this is but one method of examination, and the best results are obtained by the combination of this means and a thorough clinical study.

Dr. Arthur W. Calloway, Asheville, N. C.—There are both advantages and disadvantages of a practice in a small city. In Asheville, even with assistants, we must personally supervise the taking of the history, the clinical and laboratory examinations and should, if possible, follow the cases, which become surgical to the operating table. Gall-stones are shown with the x-ray at times very easily, owing to the position of the gall-bladder or the chemical consistency of the stone. A case should have a well defined history of cholecystitis or gall-stone colic before an x-ray examination is justified. Often we are asked to take plates when, clinically, the case does not justify them. Consequently, under these circumstances, the x-ray result is disappointing.

Dr. William D. Witherbee, Charlotte, N. C.—It is very natural that as roentgenologists we should be more enthusiastic possibly than the gastroenterologists. But as roentgenologists we realize there are more and more limitations to roentgenology, especially in gastroenterology. I have followed roentgenology since the day Roentgen first announced it, and I have watched it develop to a wonderful science—from the day when it was thought a wonderful thing that it could find a bullet to now, when we are looking at bands of adhesions. I would not for a moment say to you that it will displace the clinic. It is simply an adjunct and every roentgenologist must consider it that if he is going to make a success. A diagnosis of 90 per cent of cases by the Roentgen ray is too great.

Of course, many of the limitations lie with the patient. He has not the money to have examinations such as Cole makes, of one hundred plates; the patient has not the time. The x-ray is nothing but a shadow-graph. Knox has an article in the *Archives of Roentgenology* in which he says you do not diagnose even 35 per cent.

The last thing and the most striking thing that has appeared in roentgenology the last year or two is the work of Dr. Stewart, of New York. He injected gas into the abdominal cavity, thus outlining the soft tissues, outlining the liver, determining the condition of enlargement, tumors, most beautifully the various bands and kinks. pressure from extra-gastric masses, and he shows However, the average gastroenterologist does not want to use it because you need a surgeon close at hand.

I would like to speak about appendicitis. What is a pathological appendix? Dr. George, in his book, stated that the appendix that did not admit a bismuth meal was diseased because the lumen was obstructed. But later he said that a gall-bladder that admitted bismuth was diseased because it was open. Now, I do not think either one is true. If an appendix shows adhesions, if it holds bismuth longer than the rest of the intestines, if it has some of the other symptoms Dr. Nisbet mentioned, I do not feel afraid to call it pathologic, and in such cases I do not see why we should hesitate to send the patient to the operating room.

Dr. Niles (closing).—The point has been made this morning that any new method is liable to be received with enthusiasm, but some of its results are perhaps overestimated. There is no doubt of that. Careless interpretation or unstudied interpretation of x-ray findings have no doubt caused many blamable mistakes and have brought in

some instances not undeserved reproach on that branch of clinical research.

Roentgenology is comparatively new. We have not had a chance to orient it accurately as yet in the field of clinical diagnosis, and we therefore should not condemn its defects. Remember, gentlemen, that the practice of medicine dates back as far as Rameses II, and who would gainsay that the men practicing internal medicine today do not make mistakes? Roentgenology is comparatively an infant. It is but little over the age of twenty-one. You can not expect a particular science to spring into usefulness as Juno sprang full-planoplied from the brow of Jove. It is a boy; but it is a good boy, an earnest boy, an ambitious boy, and if you will bear with him in his doubts and fears and speed him along on his journey, he will grow in stature and usefulness and make a worth-while clinical entity along our pathway of which we will all be proud.

THE INTESTINAL PROTOZOA: METHODS OF DIAGNOSIS AND TREATMENT*

BY SIDNEY K. SIMON, M.D.,
New Orleans, La.

No clinical examination should be looked upon today as complete which does not include within its scope a routine search of the stools for protozoal organisms. In tropical or subtropical countries the truth of this need scarcely be emphasized, but in regions outside of the tropics the neccesity for such a systematic search is only gradually dawning upon the medical mind. A considerable advance has been recorded within recent years in our conception of the widespread distribution of the intestinal protozoa. In former days the impression strongly prevailed that infections with these organisms were confined almost entirely to warm countries. When isolated instances of infection did occur in other regions, they could be traced, it was thought, either by direct or indirect means, to the tropics. Thatthis viewpoint is no longer tenable has now become obvious from observations collected from many widely scattered sources. Though protozoal infections are undoubtedly endemic to a large degree in tropical and subtropical lands, certain conditions have brought about their more general distribution at the present time over almost the entire habitable world. Among these conditions the foremost in point of importance can perhaps be ascribed to the greater facilities for travel which the modern world affords. Because the human carrier is the chief, if not the sole, agent in the transmission of these parasites, the zones of new infection have naturally followed the lines of travel, and communication which have been established with endemic centers. In this country the great stimulus for more intimate relationship with the Tropics was furnished by the Spanish-American War. Though not so well understood at the time, it is most probable that the outbreak of entamebic diseases, which followed closely upon this episode in our history, can be traced directly to the return of groups of soldiers to our shores who carried the encysted forms of the entameba histolytica in their stools. In a similar manner the recent great World conflict has borne witness to the transmission of many protozoal infections into European countries from the various seats of war situated within the Tropics. In the course of an extended series of stool examinations made from soldiers who had been invalided home from these regions, Wenyon, McAdams, Dobell and others have called attention to the fact that approximately 15 per cent of these men were found to harbor protozoal organisms. Of these carriers at least one-third gave no clinical evidence of their infection. The menace to the civil population of a country suggested by these figures is quite apparent. McAdams has further estimated that the mere presence of a few of these cyst carriers in a military camp near Liverpool was the occasion for an increase of over 10 per cent of infections with the intestinal protozoa among troops whose stools had previously been found free from these organisms. Now that the vast armies of the world have been mustered back into civil ranks, a general survey should be undertaken in all parts of the world for the possible presence of protozoal parasites in the stools. If this were done, a higher incidence of infection would be discovered than is now suspected.

In the development of their life cycle

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within the human body, the intestinal protozoa, in most instances, pass through two distinct phases, a vegetative and an encysted stage. In the vegetative stage, some form of locomotion is exhibited which has for its prime object the obtaining of food. If the organism possesses tissue invasive power, it will penetrate the intestinal wall during this period, thereby setting up distinctly morbid lesions. When external conditions become unfavorable for the vegetative cycle of the organism, and especially should extinction of life be threatened, encystment occurs. Behind the resistant cyst wall all outward activity ceases and further tissue damage is rendered impossible. The process of encystment not only represents an important reproductive phase, but constitutes likewise an effort on the part of the organism toward protection against an unfavorable environment. Once having become encysted, it can exert no further influence upon its host. Experiments have shown that the trophozoite suffers rapid destruction after evacuation from the body. The cyst, on the other hand, possesses considerable power of resistance to external conditions and retains its infectivity for comparatively long periods of time outside of the body, if protected from sunlight or drying. Thus protected, it finds its way to the soil, from whence it is conveyed eventually to food and drinking water. Wenyon has demonstrated that flies constitute one of the chief means by which protozoal cysts are disseminated. The fly serves merely as temporary host for the encysted organisms, which pass through the intestinal tract without undergoing change of any kind. Passage can take place, as Wenyon has shown, within five minutes after the fly has been allowed to feed on infected material. Upon reaching the alimentary tract of its new human host, the cyst find its way through the stomach into the bowel, where it again takes up an active vegetative existence.

It is mainly because of the intimate association of the vegetative protozoa with the clinical manifestations of disease that these forms are generally recognized and have become sufficiently familiar objects in the course of an ordinary stool examination. The cyst, on the other hand, appearing in the feces usually in the absence of all clinical disturbances, is often overlooked or entirely unrecognized by the inexperienced observer. This failure to detect protozoal cysts in the stools has been the cause of many errors in diagnosis in the past and constitutes a fruitful field for false clinical deductions at the present time.

Of the protozoal organisms, which carry on an obligatory parasitic existence in the human intestinal tract, probably not more than ten are to be considered as common invaders. These include the Entameba histolytica, Entameba coli, Entameba nana, Balantidium coli, Lamblia intestinalis, Trichomonas intestinalis, Cercomonas intestinalis, Waska intestinalis, Titramitus mesnili, and the Coccidia. Of these organisms only two, the Entameba histolytica and the Balantidium coli are to be commonly regarded as pathogenic. The failure exhibited by the other organisms to penetrate the tissues of the bowel wall becomes the determining factor in their classification as harmless commensals or mere saprophytic inhabitants of the feces. In recent years some question has been raised concerning the entire harmlessness of many of the so-called non-pathogenic intestinal organisms. Haughwout believes that enough has been shown from recent investigations to despoil the flagellates of the reputation for harmlessness to man that they have previously had. Most tropical authorities consider that while the flagellates are not able to initiate a diarrhea, the presence of these actively motile organisms in large numbers in the liquid stool constitutes an additional factor in the primary disease process. The lamblia have the best claim to pathogenicity of all the flagellates, due to the intimate manner in which they attach themselves to the surface epithelium of the small intestine. Fantham and Porter report 187 cases of pure lamblia infection among 1,305 British soldiers in the recent war. Kennedy and Rosewarne likewise observed 12 cases of lamblia diarrhea among 136 consecutive cases of bowel disturbance in Gallipolli. In this country, Logan and Sanford found among 6,000 stool examinations 66 cases of lamblia infection. Many of these

individuals suffered with distinct diarrheal symptoms as a result of their infection.

Many careful observers believe that trichomonas, when present in large numbers, can produce distinctive intestinal disturbances. These organisms are frequently found in the stools of healthy individuals in all parts of the world, as may be determined by the administration of a saline purge. When present in large numbers their active movements must prove highly irritant to the intestinal mucosa. Cercomonas intestinalis is a rare species which is usually confused with the trichomonas or chilomastix.

In the differentiation of closely related species of the intestinal protozoa, the cyst is a safer guide than is the trophozoite. This is particularly true in the case of the parasitic entameba. Protozoologists are now thoroughly in accord that the differentiation of the entameba in the vegetative state is surrounded with many difficulties. In analyzing the various points of difference between the vegetative forms of Entameba histolytica and of Entameba coli, Wenyon claims that differentiation is impossible except in the presence of red blood cells. The pathogenic entameba alone is capable of ingesting red blood corpuscles, which it retains within its endoplasm. The Entameba coli and Entameba nana, on the other hand, are never phagocytic for red blood cells. Entameba can be distinguished from other cells present in the stools by adding a weak solution of neutral red (1 to 10,000) to the preparation. The entameba take up the red stain, which does not interfere with their motility while other material in the stools remains unstained.

In the encysted state, differentiation between the various species of entameba offers little difficulty as a rule. The cyst of the Entameba histolytica is of relatively small size and when mature never consists of more than four nuclei. The encysted forms of the Entameba coli, in contrast, are of relatively larger size and possess from eight to sixteen nuclei when fully developed. Entameba nana cysts are small and multi-vacuolated. The vacuoles often take up a large portion of the cell space, crowding the nuclei, usually four in number, towards the outer border.

No elaborate technic is needed for the detection of protozoal cysts in the stool. While fixing and staining of the specimen will be found to bring out many of the finer details, especially of the nuclear structure, this method is only in rare instances essential for the detection and differentiation of the cysts. In the examination of the native preparation it is best to pick out the more solid portions of the stool. A very thin cover-glass preparation should be made and as a rule care should be taken in the shading of the field in order to bring out clearly the refractile nuclear bodies. Should dilution of the fecal particles be necessary this should be done only with normal salt solution. I have found on many occasions that an aqueous solution of iodin (double gram strength) has proved of assistance in the counting of the nuclei. With the iodin stain the nucleus appears dark-brown and stands out distinctly against the light saffron tint of the cyst body itself. In the enumeration of the nuclei it often becomes necessary to focus at different levels.

Donaldson has suggested a happy combination of an eosin-iodine stain. With this stain the pale yellow cysts are more easily distinguished on a reddened background. The eosin is not able to penetrate the wall of the live cyst, while the iodin does.

In the epidemiology of the diseases caused by the intestinal protozoa the human carrier is a factor of the greatest importance. Two classes of carriers are recognized: (1) the convalescent patient, who has been improperly treated and still continues to discharge cysts in the stools; and (2) the healthy contact carrier, an important class which includes individuals who have become infected by contact with other carriers, but who have never exhibited clinical symptoms. The problem of clearing these carriers of their infection upon some broad scale has engaged the serious attention of sanitarians in many countries. In view of the success attending Bass's efforts in ridding groups of individuals in entire counties of Mississippi of their malarial infection, it would appear that a similar broad plan carried out in the case of carriers of Entameba histolytica might offer a similar hope for the control of this form of protozoal infection. It is

certainly true that an attempt should be made at all times to recognize the protozoal cyst carriers as a potential menace, and whenever possible proper measures should be taken to render them harmless to the contiguous population.

TREATMENT

The treatment of protozoal infections of the intestinal tract resolves itself into the question of the destruction of the vegetative organisms. The cyst constitutes an entirely harmless body and does not in itself come within the scope of therapeutic measures. One might as well attempt to remove a hookworm infection from the intestinal tract by destroying the eggs as to attempt to sterilize an individual harboring protozoal organisms by getting rid of the cyst.

When cysts are present in the stools this may be taken as an indication of the presence of vegetative organisms somewhere along the intestinal tract.

In only one instance do we possess a specific remedy against intestinal protozoa. The various morbid conditions which develop as a result of the penetration of the Entameba histolytica into the tissues are promptly controlled by the use of ipecac or its alkaloid constituents. Emetin merits a high place in the treatment of the acute or active phases of all forms of entamebiasis, but can not be depended upon for the complete clearing of the intestinal tract in chronic cases. For this purpose the writer believes that the entire powdered ipecac root is needed. This drug must be administered daily, however, in full concentrated doses covering a period of from ten days to two weeks. If given by mouth in one dose in the form of enteric coated pills, the ipecac can be made to reach the large bowel, where absorption takes place directly within the confines of the disease-producing area. Neither ipecac nor emetin prove destructive to the non-pathogenic ameba or to other intestinal protozoa. The lack of specific medication in balantidial dysentery has resulted in a high mortality in this condition in the past, reaching from 20 to 30 per cent.

In the absence of specific internal medication, bowel flushes are frequently resorted to in intestinal infections with protozoa. A variety of different drugs has been used for this purpose, the aim of which is to destroy the organisms directly within reach in the lumen of the large bowel. Many difficulties serve to defeat the object of this plan of treatment. In Entameba histolytica and Balantidium coli infections the organisms are buried for the most part beneath the mucosa and are, therefore, not amenable to the effects of the drugs when introduced locally. In addition it is doubtful whether fluids introduced through the rectum can be made to reach portions of the large bowel beyond the hepatic flexure in effective strength. The flagellates in all instances inhabit the small as well as the large bowel. Lamblia in fact rarely appear below the ileo-cecal valve except in the encysted form. It is manifestly impossible, therefore, to remove flagellate infections with irrigations alone. In these cases a variety of drugs have been suggested for oral administration. For lambliasis and trichomoniasis, Rhamy and Metts have recommended methylene blue in two grain doses in capsules three times a day. A persistency in the presence of trichomonads in the stools had been noted repeatedly by the writer even in the face of prolonged treatment with this drug. In one instance an aqueous solution of methylene blue (1 to 2,000) was administered by the drip method through the duodenal tube over a period of three days without permanent effect upon the organisms. Thymol has been used by some authorities with varying success. Smithies believes that a trichomonas infection can be removed by daily doses of calomel followed by a saline over a short period. For a number of years Escomel has enthusiastically advocated the internal use of turpentine as a destructive agent for both trichomonas and lamblia. This author likewise recommends a solution of iodin for rectal irrigation in conjunction with turpentine by mouth.

In the past few years the introduction of transduodenal lavage by the Jutte method, it was thought, might offer new hope for the removal of intestinal protozoa. This plan constitutes, in effect, the irrigation of the entire intestinal tract

from above down with a hypertonic or unabsorbable salt solution. Unfortunately the early optimism in regard to this method was not justifiable, as the writer has convinced himself from numerous and repeated observations.

DISCUSSION

Dr. William Litterer, Nashville, Tenn.—I have been greatly impressed with the pathogenicity of the various flagellates, such as Lamblia intestinalis, the trichomonas and the cercomonas. In the work with the State Board of Health I have seen numerous specimens coming in that have been loaded with trichomonas and other flagellates. Dr. Witherspoon, of Nashville, presented a very valuable paper on "Flagellate Diarrhea" before the last meeting of the Tennessee State Medical Association, in which he called attention to the pathogenic results and gave clinical outlines and treatment. It is evident that the flagellates are pathogenic from the character and symptoms they produce as well as from the presence of eosinophilia, and where treatment was instituted the various symptoms disappeared.

An article by Henkelmann was published about a year ago which discussed the pathogenicity of the flagellates and spoke of them as distinct clinical entities. Attention was directed to 15 cases which he had studied closely, some of them at autopsy. He states that in some of these cases the flagellates had actually gotten into the circulation. He gives his method of finding the organisms in the blood as well as the culture media employed. I do not know whether his blood observations have as yet been confirmed. I have not been able to confirm them myself on two cases of heavy infection. However, the article is well written and may be taken for what it is worth. The point to be particularly emphasized is that we are overlooking the real pathogenic power of the various flagellates.

Dr. J. Birney Guthrie, New Orleans, La.—We are admitting the pathogenicity of the flagellates. There is no question now about that fact. We have to classify them. We are finding a considerable number of benign flagellates. There are flagellates which cause disease and we do not know exactly how to get rid of them. We know that they are very stubborn as they occur in the intestinal tract. The solution of our problem of dealing with them is to be found in some method for cultivating the flagellates. It remains for some one like Bass to devise a method by which the flagellates can be cultivated, and it will then be a comparatively simple thing to find an agent which will destroy the flagellates and which at the same time will be harmless to the host. We are facing a situation which may become serious as regards distribution. Testimony is coming from various parts of the South where these flagellates are being identified. Probably more of us are looking for them, and perhaps also there is an increased distribution of them. We must be prepared by cultivating the organisms and seeking for some substances which will destroy the flagellates *in vitro*. If this can be introduced into the intestinal tract possibly through the duodenal tube, a long step forward will have been taken.

TROPICAL DISEASES AND PUBLIC HEALTH

TUBERCULOSIS INFECTION AND TUBERCULOSIS*

By B. L. Taliaferro, M.D.,
Catawba Sanatorium, Va.

The purpose of this paper is to discuss the difference between latent infection and active tuberculosis.

If you think the subject over carefully you will see how groundless is the undue fear of catching tuberculosis. When fear of infection disappears and when you realize how many people are cured of it by Nature, you will have a greater interest in the disease. Greater interest will cause you to study the modern ideas of treatment and prevention and you will be surprised to find what wonderful results can be obtained by the rest, food and fresh air treatment of tuberculosis. Even in moderate and far advanced cases whom you formerly considered hopeless you will be amazed at the results of prolonged rest in bed.

It has been said that every one has a little tuberculosis. At least one-tenth of all deaths that occur in the United States each year are due to this disease. With 150,000 deaths a year, 1,500,000 living cases (10 living for each death) would not be an excessive estimate. When you consider the universal habit of spitting, you wonder how any one can escape infection. If saliva were only blue you would find very few objects in the world that are handled by man without a blue mark on them. Have you ever noticed how the street car conductor puts his spit-moistened thumb on the transfer he gives you? You put your thumb on the spit and then put the thumb to the mouth. It is a transfer of spit. Children rolling hoops, playing marbles and other outdoor games get raw, fresh sputum on their fingers. The baby crawling on the floor soils his fingers with the fresh or dried spit which has been brought in on shoes. Fingers and thumbs are in and out of their mouths all through the day. How can he escape infection?

How many unclean, spit-soiled objects have you touched today? How many of you doctors have spit-free hands? Do you put your thumbs or fingers in your mouths?

When you think about it for a moment you must admit that it is almost, if not quite, impossible for a child to reach adult life without having picked up at least a few tubercle bacilli. I am firmly convinced that many of the so-called continued fevers and other mild upsets of childhood are due to infection in some of the lymphatic glands, deep or superficial. After a short indisposition the little one seems quite well again and the gland subsides. The process is walled off and no further trouble occurs in the vast majority of such cases.

Later in life the resistance is lowered from some disease or from overwork, under nourishment, bad living conditions, etc., and the old lesion takes on new life and spreads to the lung or other organ and we have tuberculosis, the disease.

In spite of universal mild infection, or we may say partly on account of it, the death rate has steadily and continuously fallen from more than 300 deaths per 100,000 living in 1882 to 141 in 1916. During the war it rose slightly. Better housing conditions, higher wages, greater knowledge, general improvement in living conditions, education of the patient and public along lines of prevention of infection have all helped to lower the death rate. It is believed, however, that slight childhood infection plays an important part in the partial immunization of the race. A prominent tuberculosis expert has been quoted as saying, "God help the man who has not been infected with the tubercle bacillus." Primary adult infection, if it ever occurs, is followed, I believe, by a rapid course and early death.

L. Brown, of Saranac, in a study of several thousand cases of supposed marital infection, found that the incidence of tuberculosis in married people where one partner has the active disease has not been shown to be greater in the other partner than in the general public. I know you

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will cite case after case in which you believe that the husband caught the disease from the wife, or vice versa. If you will study the case carefully, in nearly every instance you will find that the wife or husband had been exposed to some far advanced relative, nurse or friend during childhood. Even if you fail to find a definite exposure in the history you will not be able to prove that infection in childhood had not occurred.

If adult infection occurs at all, it certainly ought to be most frequent in married people when one of the couple has the disease. Careful study has shown this is not the case.

It is more a question of how much infection we have rather than whether we have it or not.

Admitting universal infection, we may say that 90 out of every 100 people have the infection, but have sufficient resistance to overcome and hold it in a latent or dormant state, while in the remaining ten the latent or quiescent infection develops into active clinical tuberculosis as a result of lowered resistance from some cause.

"Now, if all this is true," you ask, "why spend money on health work and sanatoria to prevent infection with the tubercle bacillus? If infection produces a partial immunity, why not favor careless spitting and general exchange of saliva?"

A small dose of strychnin may help while a large dose will kill. This is true of the tubercle bacillus. No matter how hard we try in this generation, we are not going to break the adult population of spitting and passing out saliva in coughing and sneezing and finger licking. But we must try with all our might to prevent massive infection of children in the home of the far-advanced case who raises billions of tubercle bacilli a day. Children are very susceptible. Many thousands succumb to joint and bone and lung infection in childhood. We must reduce infection to a minimum. We must not let down the bars. Until the war we were making good progress. Since 1900 the death rate had been reduced 30 per cent. We must not let up in our fight. Let us not fear infection in adult life, but use our knowledge to prevent massive infection in childhood.

Finally, let us impress on the public the importance of keeping up a good resistance by avoiding all excesses, by taking proper rest, moderate exercise, living and sleeping in well ventilated rooms, regular yearly examinations and by careful attention to minor complaints. Advocate the building and use of sleeping porches, fresh air schools, medical inspection and examination of school children, sanitary factories and dwellings. Continue the work against hook worm, malaria and all diseases and conditions that tend to lower resistance.

DISCUSSION

Dr. Everett E. Watson, Salem, Va.—Probably no other phase of tuberculosis has received as much study as the question of infection, and none of us are so rash as to say that the last word has been said. Many years ago we considered tuberculosis hereditary. It has been definitely proven that this is not true. There have only been about twenty-five cases in literature in which a child was born with tuberculosis. The question arises as to when and how we get the infection. Cornett first advocated the theory of inhalation of bacilli-laden dust. He took the dust from rooms and workshops where consumptives lived and worked, and inoculated animals and gave them tuberculosis. Flugge, twenty years ago, tried to discredit Cornett's theory. He made tuberculous patients cough on Petre dishes and grew colonies of tubercle bacilli; he also had patients cough into a pen of guinea pigs and found by autopsy that they were tuberculous. He, therefore, concluded that the majority of infections were the result of the inhalation of fine, moist particles of sputum from sneezing or coughing. Later on, Cheveau and Garlach tried to prove that the majority of tuberculous infections were the result of the ingestion of the tubercle bacillus gotten through milk or other infected foods. Unquestionably all these men were partially right. Dr. A. K. Krause, of Baltimore, holds that most infections are due to hand-to-mouth infection, and I think his idea is good. He believes that in the majority of cases the bacillus gains entrance through the tonsils and nasal mucous membrane as a result of the child getting the bacilli on his hands and thence to his mouth and nose. The incidence of infection begins to increase with the increased activity of the child. There are very few cases of infection known under one year of age; at two, 10 per cent; by the age of four, 25 to 30 per cent; at ten, 50 per cent, etc. Thus we see that the incidence of infection does not begin to increase rapidly until after the fourth year, and by the age of ten 50 per cent are infected. Therefore, we can appreciate the danger, to the child, of the careless consumptive who spits on streets, puts his fingers in his mouth and otherwise spreads the bacilli wherever he goes.

Baldwin, of Saranac, says that childhood is the time of infection; that adults are in little, if any danger. I believe that is true, because in

the thousands of cases where histories have been taken there are few in which we can not trace the infection back to childhood in some way. So we should be careful in spit-swapping, as the doctor has said. It is a very expressive term and I think carries a good deal of force. Dr. Taliaferro said that his paper would probably make people careless because if adults are not afraid they will be careless. That may be, but it is the child we must protect, and if we can protect them by being careful and using every means at our command to prevent tuberculosis in the child, we will in a great measure prevent the disease. It is absurd, I believe, for adults to live in mortal fear of the tuberculous patient.

Dr. Roy D. Adams, Washington, D. C.—If the impression is correct that we get practically no tuberculosis in adult life it would seem that our health regulations directed toward the elimination of tuberculosis were in a measure misdirected. However, it has been pretty conclusively shown that the incidence of tuberculosis and the death rate from tuberculosis run nearly parallel with the general health rate, and after all, although it may be futile to attempt to prevent adult infection, we do accomplish a purpose in minimizing the tubercular infection, that is, we enab the individual to get his early dose in a more diluted form.

The question of the transmission of tuberculosis from one adult to another seems to me to depend to a considerable extent on the definite reaction to the first dose of tuberculosis, and in the second place to the infections with which the individual has been previously inoculated. This is entirely different in animal experimentation. The experiment of Koch has demonstrated an entirely different reaction to the initial infection. In cases of manifest tuberculosis which follow an initial infection which is sufficient to produce a definite manifestation of the disease, the predominant feature is marked hyperplasia of the lymphatic glands. In India, or in Africa or the tropics it is different in its manifestation in adults. The predominant feature is the reaction of the lymphatic glands. Often the pleura will be covered by a massive exudate. The lungs are dry and pneumonic. The heart seldom is infected, but in chronic tuberculosis it is frequently infected. This is an entirely different clinical picture from that in adult cases of tuberculosis in this country.

In regard to widespread infection it has been pretty definitely shown that in a virgin soil tuberculosis, when it becomes manifest, runs a rapid, acute course. In the autopsies done on the other side on American soldiers, although they found a few cases which resembled tuberculosis as they see it in the fulminating cases here, most of the findings were those we are accustomed to see in chronic cases of tuberculosis on this side.

Mr. Ernest Kelly, Washington, D. C.—It is difficult for a layman to talk to physicians on a subject like this. It has been pretty well proven that the infection of the human being with the bovine bacillus is a fact. The work of Park and Krumweide in New York to me has great significance because of the fact that they found in examinations of children that a considerable proportion of tuberculosis was due to the bovine type of organism. A part of the infection of children is due to the use of milk from tuberculous cows. I do not say that for any scare-head effect, but I have seen so many post-mortems of cattle and I have seen the result of so much work on the disease among cattle, that I am convinced it has a very potent influence on the health of human beings.

We have found that the milk as it comes from the udder of the cow is generally free from tuberculous organisms, except in cases where the udder itself is the seat of a tubercular lesion. At least I know of no instance where tubercular organisms were ever recovered from the milk stream except in cases of udder infection. But Schroeder has shown that in the operation of drawing milk from the cow there is considerable contamination of the milk from manure, from the body of the cow becoming splashed and dropping into the milk pail, and he has found that a considerable portion of the milk supply of the average city is actually infected with tuberculous organisms.

The means to remedy this situation are twofold. First, we can have healthy cattle, so far as we can determine by the use of the tuberculin test. In our experience this is 98 to 99 per cent accurate. Those cattle reacting to the tuberculin test will show lesions in 98 to 99 per cent of cases at post-mortem. Some animal far advanced in the disease will not ordinarily react, but these can usually be detected by careful physical examination.

We can either apply the tuberculin test or we can see that the milk is properly pasteurized. I think it is proven that the tubercular organism is killed by heating to 142° F. for thirty minutes. We recommend that the milk be heated to 145° F. to allow for variations which occur. Of course in many of the smaller towns the people are able to secure milk from healthy herds, but there is no question that in the average city of any size proper pasteurization under competent supervision is the greatest immediate safeguard that can be secured.

Some advise the use of raw milk. I know of one dairy producing milk from 600 cows. These cattle had been tuberculin tested for years. A new test was made and over 200 cows reacted and were removed from the herd. This milk had been used especially for infant feeding for years, had been labeled and stamped with the approval of the milk commission as being the safest milk to feed children. We have had outbreaks of septic sore throat and other outbreaks from raw milk supply. Milk is handled a great deal from cow to customer and by so many people that it is not always possible to supervise them all in a large city. I am convinced, first, that milk is a potent factor in the transmission of tuberculosis from cattle to the human family; and second, that proper pasteurization at 145° F. for a half hour is the greatest safeguard that can be afforded as regards the milk supply.

Dr. Taliaferro (closing).—I would not be understood for a moment as advocating letting down the bars in the prevention of tuberculosis along

the lines we are working at the present time, but I would urge that we insist more upon educating the public with regard to what I called spit-swapping.

We try to teach the patients at Catawba Sanatorium the truth as far as we know it, and I feel that we ought to tell them the truth about infection. We urge the importance of not infecting children, and we tell them that of course if they are careless among adults they will be careless among children. We teach them good habits at the Sanatorium, to cover the mouth when coughing and sneezing, and we insist on their using a folded piece of gauze, several folds, so that neither their hand nor the pocket will be contaminated, and then they do not throw it down, but keep it folded and have it burned.

A few years ago I was here in Asheville and I was in mortal fear of being infected with tuberculosis. That was before I had studied the subject. I can easily understand the fear that people have. I have the greatest sympathy with them, and that was one of my reasons for writing this paper.

As Dr. Watson said, the last word has not been said, but I believe we are getting nearer to the truth and to the last word at the present time.

THE MALARIA PROBLEM OF THE RICE FIELD OF THE UNITED STATES*

By J. C. Geiger, M.D., Dr.P.H.,
and
W. C. Purdy, M.S.,
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The assignment of the investigation of the effect of rice culture on the incidence of malaria in the United States was given to one of us (Geiger) in April, 1917, by Assistant Surgeon-General H. R. Carter. The work was begun in Louisiana in the vicinity of Crowley. Since that time and notwithstanding interruptions because of the necessity of performing other duties incident to the United States' entry into the World War, the investigation was extended, in 1918, to the rice fields of Arkansas near Lonoke, and in 1919 to those of California, near Chico. The outstanding features as ascertained so far are:

1. The practical possibility of malaria control in any rice district, but limited in its scope of application because of cost and the obvious difficulty of the essential and continuous control of the human carrier.[1]

2. The very evident small amount of malaria prevalent in areas so far investigated as determined by history and blood indexes of actual residents of the rice fields and in towns and villages adjacent thereto.[2]

3. The enormous production of anopheles mosquitoes of practically one type, the anopheles quadrimaculatus, in the rice fields of Arkansas, a lesser degree of production in Louisiana conforming to three types, the anopheles punctipennis, crucians and quadrimaculatus, but having a decided seasonal type variance, and the negligible production of any type in California.[3]

4. The recording of experimental but actual mosquito control in rice fields through the use of oil and top feeding minnows along with a few observations of the possibility of a chemical control by fertilizing material such as the acid phosphates.

5. The determination of experimental flight distance of one mile of the rice field bred anopheles quadrimaculatus along with the recording on separate occasions on observational flight distance of 1.7 miles of the same type of mosquito. The experimental flight was of added importance since the majority of stained mosquitoes used were engorged females, therefore possibly infected. Again, the flight was towards the maximum concentration of available human material and away from the maximum breeding area.

EPIDEMIOLOGY

A. General.	*B. Specific*
Physiography	History Indexes
Comments	Blood Indexes

The epidemiology of the rice fields so far as it concerns malaria may, to advantage, be divided into two separate heads, A and B. Under A, we can consider physiography and comment freely on certain observations having important bearing on the subject. Under B, we must consider the specific facts learned through history and blood indexes.

A.—Rice cultivation has been successfully carried on in Louisiana for at least twenty-five years, for fifteen in Arkansas, and for the past seven years in California. The physiography of the rice fields them-

*Read before Conference on Malaria (National Malaria Committee), Southern Medical Association, Thirteenth Annual Meeting, Asheville, N. C., Nov. 10-13, 1919.

selves is comparatively similar in the above states, but in California differs totally as to the surrounding country from Arkansas and Louisiana. California is not broken up into small and sometimes large number of groves of trees, swampy areas, and low undulations, usually carrying water and frequently of considerable size, with wooded banks, the so-called bayous. Again, the rainfall in Arkansas and Louisiana is absolutely dissimilar to that of California, there being instances in Louisiana in 1919 where the rainfall was sufficient to maintain the proper amount of water necessary for rice cultivation without adding to the initial flooding. To this increased precipitation for 1919 may be attributed the added incidence of malaria which was distinctly obvious in the Louisiana fields in September. As an offset to the rainfall, the farming methods used in California particularly in reference to drainage can not compare to those of Louisiana and Arkansas, though these are, in themselves, by no means perfect. In all the areas investigated, rice cultivation methods are for lucrative returns first, and as a result, drainage ditches are badly maintained. Thus very suitable mosquito breeding places and likewise the number of mosquitoes are considerably increased.

To the average person it would seem that since the rice fields and their resulting environment produce mosquitoes in countless numbers, screening would be a measure universally used if only for personal comfort. It is illuminating here to record the efforts of a Louisiana rice farmer to screen his barn rather than his house. In answer to a direct question he gave the simple but plausible explanation that he obtained more work from his mules. Within the past few years screening against mosquitoes is being universally carried out in Louisiana, less in Arkansas, and in California it is 100 % imperfect on account of improper installation and size of wire mesh.

B.—To determine to what degree is the frequency of malaria in the rice fields, the popular local belief invariably being that it was excessive, history and blood indexes were taken in parts of all three districts with interesting comparative results. These results are a valuable contribution to the knowledge of malaria in California, Arkansas and Louisiana, inasmuch as they allow one to centralize such information as specific for local districts, entirely apart from the malaria endemicity in the state as a whole.

History Indexes.—These indexes were based on the history of chills and fever for the previous summer, and they offer parallel data for the areas investigated. The total incidence of malaria from history alone in the combined rural and town population in both the Louisiana and Arkansas districts is the same, approimately 29 %. The history incidence in California, when compared to that in Louisiana and Arkansas, is almost one-third less. The incidence in all of the above areas was twice as high between the ages of 10 and 15 and equally distributed between sexes. In Arkansas and Louisiana, contrary to what we expected, the comparative incidence of whites and negroes was practically the same.

It is interesting to note that rice has been grown in Louisiana and Arkansas practically twice as long as in Calfornia. This does not by any means explain the low endemic incidence of California, since in Richvale, a comparatively new in age but an old rice town, we have practically a negative history and an absolutely negative blood index. Ninety-five per cent of the residents are Swedish and came direct from Nebraska and give no previous history of malaria. Therefore, Richvale is a new but old rice town with no previous or present history of malaria. How long such a community may remain uninfected is a matter of conjecture. The advent of strangers as possible carriers would offer their best means of infection since anopheles quadrimaculatus were in evidence. Investigation showed that such contact does occur in a very small way in July, the time of water grass pulling, and in a large way during harvest time, the middle of October. It is our opinion that mosquito production and flight are negligible at this time.

Blood Indexes.—A slide endemic index (thick smears) was obtained from over 5,300 persons in January, April, May and June in the areas investigated. The month of obtaining the index was not chosen for

any particular purpose except in Arkansas, where control measures were the paramount issue. It is fortunate that all indexes with one exception were taken in the spring months, January and May in Arkansas, April in Louisiana and June in California. It is interesting to compare the gradual increase, January .5, April 1.1, May 1.6, and June 2.2. These results can easily be considered low, even for a spring index. Granting that such an index does vary in different seasons and that the history index of chills and fever is not entirely reliable, one is at a loss to judge conditions, because neither are indicative of a grave malaria incidence. Reports of clinical cases checked by microscopic examination of blood offer the best means of judging the malaria incidence of any community, and even these may prove inaccurate because of self-treatment, which is the universal rule in Arkansas.

One is apt to call those proved positive on microscopic examination in malaria endemic indexes, true carriers. It is interesting here to record that in Arkansas and Louisiana the blood of the majority of the positives showed only ring forms of the malaria parasite, while those in California give directly opposite results. Again in Arkansas on several occasions opportunity was given us to study the intermittency of the carrier. One could, from our California results, easily assume that the season changes, the cleavage probably occurring in June, the form and number of parasites in the blood of the malaria carrier, therefore, increases materially the danger to the community and bringing on in observed instances a distinct clinical relapse.

MOSQUITO OBSERVATIONS

Rice fields would be known to be a large factor in the incidence of a mosquito-born disease, such as malaria, if it could be shown (1) that malaria-bearing varieties of mosquitoes do breed in large numbers in this environment, and (2) that these rice field-bred anopheles are capable of transmitting infection. Then it would logically follow that, if malaria patients be accessible to the mosquitoes, these rice fields would indeed be vast potential danger zones accompanied by inefficiency which would be stressed in its importance by incalculable economic loss.

A knowledge of the facts in the case is, however, imperative. We want to know (1) if malaria-bearing anopheles breed in quantity (a) in the rice fields, or (b) in the puddles, ditches and slow-moving streams created temporarily by supplying water to these fields and later draining them for harvest. (2) If malarial mosquitoes breed in the fields, is there a remedy capable of practical application, such as a larvicide which will not harm the rice, or an effective natural enemy, such as top-feeding minnows. (3) If outside puddles and drainage ditches resulting from rice culture are chiefly responsible for the breeding, if it is feasible, and if it is possible, from an economical point of view, to so handle this water in the flat rice-growing districts that breeding of mosquitoes therein may be controlled. Finally, (4) it is still an unsettled question whether rice field-bred anopheles can acquire and transmit malarial infection as readily as do those malaria vectors which breed in natural water bodies. There are statements by Celli and Stanborn which are quoted by Ross that anopheles, normally efficient vectors, may lose this power by (a) certain foods and (b) hyper-parasitism. Whether this condition obtains for this anopheles breeding in rice field areas is believed to be worthy of further investigation. We wish to record here a negative transmission experiment with rice field-bred anopheles quadrimaculatus while working in the Arkansas fields. It must be remembered and taken into consideration that we were conducting our experiments on typical carriers showing few parasites.

Two years of work has put us in possession of valuable data relating to problems 1 and 2. Problem 3 is largely a matter of engineering skill, community enlightenment, and community effort, both of which must be persistent and untiring. Problem 4 is unsolved.

INVESTIGATIONS OF BREEDING IN ARKANSAS RICE FIELDS

General Plan of the Work.—During 1918 ten small fields of rice, of one acre each, isolated by levees, but forming a part of larger rice fields adjoining, were under

continuous observation. All of these ten fields were watered separately from a canal whose water had not previously been on rice. All fields were subject to the usual program of watering as practiced in Arkansas. Examinations for presence of larvae were made every week or ten days. Frequent examinations were made in the large fields adjoining and in other nearby rice fields.

Technic.—The deeper water along levees and also the midfield, where rice stood thick, were examined for larvae by taking an equal and constant number of dips in each of these two typical environments of the rice field. After recording results, larvae were replaced in the field. The total number of larvae and pupae thus found along levee and in midfield was regarded as the "catch," and this constituted the basis of comparison used. This procedure was adhered to throughout. Presence of other forms of life, both plant and animal, was recorded.

Other Water Bodies. — Water bodies other than the rice field were not accessible for similar routine examination and comparison, for the reason that every possible breeding place was subject to rigorous control measures due to the presence of a military camp near Lonoke. Many ditches and puddles showed heavy breeding when found, but immediate control measures prevented further examination.

TRIAL OF REMEDIAL MEASURES

The ten rice fields referred to above were used during part of the season in trying out oil, oiled sawdust, top minnow and intermittent irrigation as control measures.

Emphasis was necessarily placed upon two points: (a) the remedy applied must not result in injury to the rice; and (b) the mosquito larvae must be heavily reduced.

1. Oil.—An effort was made to protect rice from injury by applying the oil by a drip-can placed at the water entrance, thus delivering the oil as water flowed on the plot. Results were not satisfactory. The oil puddled in the rice within a radius of fifty feet or less about the entrance. While larvae were killed within this area, they were not reduced materially in other parts of the one-acre plot to which oil did not penetrate. A little of the rice was killed by the oil.

Another method produced excellent results. Dry sawdust was saturated with oil and sown broadcast in the rice, one bushel of sawdust thus distributing three gallons of oil. No harm was done to the rice, perfect distribution of the oil was obtained, and larvae were almost eliminated. So far as known, this method of protecting rice from injury by oil which is applied in sufficient amount to form a larvicidal film was first used in our rice plots in Arkansas.

2. Fish.—Fourteen hundred minnows (*Gambusia*) placed in a one-acre plot resulted in moderate reduction of mosquito larvae, except the very minute ones. The fish, once introduced, apparently continued their moderate destruction of larvae during the remainder of the season.

The fish were always to be found near the water inlet of plot or along the levees. Very rarely was one seen in midfield, where rice was thick and the light much reduced by overhanging rice stalks. However, nearly half of the mosquito larvae were found in midfield. It thus seems that these fish are larvicidal agents of only moderate effectiveness in a rice field.

3. Intermittent Watering.—This means draining the rice plots and thus removing mosquito larvae, then reflooding plot before the rice suffers injury. Trial of this scheme on two plots demonstrated that mosquito larvae are removed in part, but not destroyed, and that as a remedy it is not applicable to rice field conditions.

RESULTS

Net results may be summarized as follows:

A. Breeding.—Anopheles breeds within certain areas of the rice fields of Arkansas in about equal quantities with culex, both being found in moderate abundance outside of rice fields.

The breeding (which occurs with fair uniformity in all parts of the field), begins about ten days after the fields are flooded, and continues, with some variations, until late in September.

B. Control Measures.—Oil can not be applied in the usual manner in rice fields

without injury to the rice, but the latter may be protected from injury by oil such as used for larvicides and this successfully applied with excellent larvicidal results by means of oil-soaked sawdust sown broadcast.

Top minnows produced moderately good results when 1,400 were present in a one-acre field.

The rice field containing a heavy stand of rice is not comparable with a pond containing little or no obstruction to movements of fish, nor with a ditch whose chief dimension, length, may be continuously patrolled by scores of fish. The rice field is a continuous series of excellent hiding-places for the larvae and of effective obstacles for the fish.

Intermittent irrigation with untreated water is a failure in Arkansas as a remedy for mosquito breeding in the rice fields.

INVESTIGATIONS IN CALIFORNIA

General Plan of the Work.—This was similar to that in Arkansas, but three distinct environments were accessible for study throughout the season from April to October. These were (1) seepage water, in roadside ditches, etc., near large irrigation canals; (2) small irrigation ditches, grassy and neglected; and (3) rice plots and rice fields.

Observations were begun about April 15 on a number of puddles and ditches and on a puddle or two within the area later to be planted to rice.

Rice is sown about the first week in May. Water is then turned on for a few hours, to soak the ground and hasten germination of seed. This partial watering is done two to three times a week for about five weeks, when (the rice now being 8 or 10 inches high) the fields are flooded and kept in this condition until drained for harvest.

Nine plots of rice, of one-fifth acres each, were kept under constant observation. Weekly counts of larvae were made in these plots and in the large rice field adjoining. Weekly examinations were also made on a large roadside seepage puddle near by (whose water came from the rice fields canal), and on three small, grassy irrigation ditches two miles distant. At one of these ditches a concrete bridge furnished an ideal place for collecting imagoes. These collections were continued from June to November and were identified later at the laboratory.

In all cases an "examination" consisted of a definite number of dips taken at representative places in the ditch, puddle or field concerned.

RESULTS

It was soon observed that, while breeding was moderate in the seepage puddle near the rice plots, the plots themselves, located just on the reverse side of the rice fields canal, showed practically no breeding. Meantime breeding was heavy in the small grassy irrigation ditches. The following tabular statement will illustrate:

AVERAGE NUMBER OF MOSQUITO LARVAE PER EXAMINATION

Environment	Months May	June	July	Aug.	Sept.
Seepage puddle	26	18	6	3	2
Irrigation ditches	15	12	17	34	96
Rice plots		1	1	*1/3	1
Rice field		1	0	*1/3	1

It is thus apparent that, as the present investigations show, mosquito breeding in California is not a problem so far as the rice fields themselves are directly concerned. This is emphasized by results of examinations in the Arkansas rice plots. The technic was identical, and the following comparison is based on the same number of dips constituting an examination:

AVERAGE NUMBER OF MOSQUITO LARVAE PER EXAMINATION IN RICE PLOTS IN ARKANSAS, 1918, AND IN CALIFORNIA, 1919

	June	July	Aug.	Sept.
Arkansas, 1918	9	13	7	19
California, 1919	1	1	*1/3	1

*One larva was found in three examinations.

In the Arkansas investigation the only anopheline found in quantity was A. quadrimaculatus. In California, the catches of imagoes under a bridge during June to September, inclusive, show that A. occidentalis (which is practically the same as A. quadrimaculatus) is the prevailing anopheline as shown by the following tabulation:

IMAGO CATCHES UNDER BRIDGE, GIVING PER CENT OF VARIETIES TAKEN IN CATCH

	June	July	Aug.	Sept.
	%	%	%	%
A. Occidentalis	49	9	37	87
A. Pseudopunctipennis	0	6	14	6
C. Tarsalis	37	75	46	5
Ales currei	14	10	3	0

LOUISIANA

Observations were begun June 1. In large rice fields, ten days after irrigation, mosquitoes were breeding in quantities of sanitary importance.

Successive catches in June showed only anopheles crucians and A. punctipennis, the former about twice as abundant as the latter. A. quadrimaculatus was first found in the latter part of June, and by July 10 had superseded all other. These observations as to breeding were checked by catches of imagoes in nearby barns. During the latter part of June and the first of July, salt water entered the Louisiana canals. In a field containing this water, showing from 12 to 23 grains of salt per gallon, A. crucians was the only anopheles present.

In September and October, 1919, observation showed very few and small anopheles quadrimaculatus breeding. The unusual number of top-feeding minnows present could be considered as constituting perfect fish control.

CHEMICAL CONTROL WITH FERTILIZER MATERIAL

In Louisiana, a limited number of observations were made on rice plots in which fertilizing material of various kinds had been used. These observations were concentrated on the acid phosphate group and show an unusually small number of larvae when compared to similar areas in the same vicinity. Due to the fact that the absence of a normal growth of rice in the plot so treated may have influenced the production of larvae, these results can only be considered interesting and a basis for future work and observations.

GENERAL SUMMARY

1. Mosquito breeding in rice fields themselves is a problem in Arkansas and Louisiana, but not in California. Various references have been made to increased breeding outside of the rice field. That this would not influence materially mosquito production if control measures were instituted in ditches, etc., was demonstrated in Arkansas, where such measures were rigidly carried out.

2. Top-feeding minnows and oil-soaked sawdust are two control measures that are applicable to rice field conditions. In the former this was conclusively demonstrated in September and October, 1919, in the rice fields of Louisiana, particularly at the United States Rice Experiment Station, Crowley. In some twenty plots on this station, one-tenth acre in size, over 1,000 dips into the water were made. In no instance were anopheles larvae more frequent than 1 to 20 dips, and these larvae were small in size. Such conditions prevailed around the levee and in the shaded midfield. A like condition, practically, existed in the ditches outside. This could be considered perfect fish control.

In the latter, the cost of application of such a control measure may prove too much an added expense to the crop itself; though such a measure would be used only within flight distance of villages and towns.

3. Malaria at this period in California is not itself a menace to the cultivation of rice and therefore community health. Louisiana and Arkansas districts have many and grave possibilities, as demonstrated by the enlarged incidence of malaria in Lousiana in 1919. Screening of living quarters ordinarily imperfect in all the above districts should be intelligently carried out. Likewise, accurate reporting and proper treatment of clinical cases by physicians should be rigidly enforced.

4. Transmission experiments with rice field-bred anopheles mosquitoes shares in its importance in the problem with the determination of the factors as to the absence of anopheles larvae in the area investigated in California. The former is necessary in view of our epidemiological findings and our negative results of the transmission experiments carried out in Arkansas. The latter is singularly important, if we can determine the factors influencing same and duplicate in other places like conditions.

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DISCUSSION

Dr. Charles W. Garrison, Little Rock, Ark.—Owing to the combined methods of controlling

malaria it was controlled in the extra-cantonment zone around Lonoke and controlled perfectly.

In regard to the commercial proposition, it seems to be impracticable, certainly in Arkansas, as an economic measure. It is a little beyond us yet, but the methods of the public health authorities were effective in this zone.

Dr. H. R. Carter, U. S. Public Health Service, Baltimore, Md.—The investigation of the effect of rice culture on the prevalence of malaria, and the effect of the use of water for the purpose on the prevalence of malaria, are justly field problems, and field problems of great value. The object of the investigation is to determine a means to control the mosquitoes. The work of malaria control in rice fields was commenced in the early spring of 1917. We then went to war and had to stop it. Of course all of you know the physical requisites of raising rice. The land has to be flooded from an inch to six inches during practically all the mosquito breeding period. Rice has been raised in many countries. In Italy they have a law which does not allow rice to be raised within one and one-half kilometers of a village. They have given up the control of malaria. In India the rice fields are in the healthiest part of that malaria-ridden country. That is due to the fact that the particular kind of anopheles breeding there does not carry malaria. The highlands are far more infected with malaria than the rice fields. Of the Atlantic Coast I know something, because my people used to own the land, and the negroes only went in to work after the "miasma" had been dissipated by the sun. Such fields as I have investigated there breed anopheles freely. Nobody is supposed to live on the rice fields. In Arkansas it has been found that the villages and farm houses in the rice fields are not badly infected with malaria. In the little town of Stutgart there is little malaria. At Lonoke they found a total blood index of 1.6, practically none at all, and yet the heaviest breeding of anopheles that has ever been recorded on earth was there at Stutgart. Mr. LaPrince investigated a barrel and counted over 2,800 winged insects. Nothing in any other place will touch the breeding that occurs around Stutgart, and yet malaria is not a serious problem there. Nevertheless, I can not make the statement that was made regarding India, for they are the anopheles quadrimaculatus, a most efficient carrier.

In Louisiana, we found that the malaria was said to be on the bayous and not in the rice fields. My first step was to determine whether that was true, and the blood index is the best test. We took a blood index there and found it low, which means little malaria. The next question was the amount of anopheles breeding. It was free, but not as profuse as we suspected. The next thing was to determine whether production took place. Breeding is one thing and production another. There may be a good many larvae, but not much production of imagos. We intended to visit the barns and stables and see how many winged mosquitoes we could find and catch, then to go into the houses, and determine if the screening was effective. If we found that they freely went to the barns and to the houses there were only two things: either they had no means of becoming infected by people, possibly few gametocytes in their blood, or the insects were not capable of being infected. In Louisiana and Arkansas the people travel about a great deal and a community can not go year after year without gamete carriers coming in. The next thing was to have comparisons made to see if the insects were incapable of being infected. That looks like a far-flung thing, and we have not yet been able to carry it out, but there are some things which make it necessary to examine into it. Cases of the kind have been reported from Africa and from some places in Italy. It is possible that anopheles from these rice fields are not capable of conveying malaria. Unquestionably there was no limit in Arkansas to the number of anopheles that were there, and while there was some malaria there was not a great deal of it.

The methods of control were not directed toward prevention of anopheles; that need not be attempted in a rice community. It lays between screening and elimination of gametocytes from the human carrier.

In Lonoke an aviation camp was established and it was not permitted to raise rice within five hundred yards of the camp. In attempting to prevent the infection of the men we tried two things: we screened the village to protect the anopheles from the people who carried the gametes in their blood. Then we tried the cure of the carriers found by the blood examination, and the results were extremely good. There were 522 cases of malaria in 1917, the year before our work, and only a single case in 1919.

The rice problem is a very great one. In California anopheles do not seem to breed in the rice fields. In Arkansas they give the biggest production that has ever been recorded. California has no problem with the anopheles, except handling the irrigation ditches.

I can not say I ever found anopheles in a place where I did not think they would be, but I have not found them in a great many places where I thought they would be, and the California rice fields may be one of them. We do find them in the rice fields of Louisiana and enormous breeding in Arkansas, but practically no malaria around the rice fields in Louisiana and California, and very little around the rice fields in Arkansas.

Dr. Charles W. Garrison, Little Rock, Ark.—Dr. Von Ezdorf, who made the first survey in Arkansas, offered this suggestion: that Stutgart was the best screened town in the State and the residences in the rice belt as a rule were better screened than other towns of necessity because

of the enormous production of mosquitoes, and the doctor felt that was a very determining factor in the reduction of the incidence of disease in those particular towns.

Dr. Graham E. Henson, Jacksonville, Fla.—One of the most important points made during the entire morning is the demonstration that with a low blood index of a community it matters little as to the number of anopheles present. With a high blood index and a small number of anopheles you will have a larger percentage of malaria than with the low index and many anopheles. I demonstrated many years ago that the intensity of an infection is very largely affected by the number of gametes that are contained in the individual upon which the mosquito feeds. In other words, the blood of the individual containing 100 gametes to a mm. will give a much more intense infection to the mosquito than those individuals who have a low percentage of gametes in comparison with leukocytes. This mosquito in turn transmits a more intense infection.

Mr. J. A. LePrince, U. S. Public Health Service, Memphis, Tenn.—One observer, who has been studying the malaria problem, has stated that there are times in the rice fields when they are unable to have enough labor to care for the crops because of the frequent chills and fever among the field hands. In the California district it would seem that the outlet or seepage ditches are the main source of trouble, and apparently the controlling of anopheles production can be accomplished by drainage. The whole problem appears to come down to the question of whether or not we can treat the rice fields of Arkansas to make them similar to the fields of California, i. e., prevent anopheles production in the flooded rice fields. There may be other methods of control by the treatment of the water by some means not yet understood.

Dr. James A. Hayne, Columbia, S. C.—I am interested in the question of the rice fields. South Carolina had rice fields when Arkansas was a swamp and California an unknown quantity. We, however, abandoned the raising of rice. In regard to the question of malaria, in the rice fields in South Carolina there was plenty of it. The inhabitants formulated for us, without any information about the mosquito, plans as to how they could live on the rice fields. They knew they must never go out after sundown, and they must not get up and go out in the morning until the dew was off the grass and the sun at least an hour high; that they must live on the second or third floor; that pine smoke was very effective in keeping off malaria. And those workers formulated a plan by which they could live even though there was malaria, and much of it, in the rice fields. As to why this breeding occurs and does not occur in certain places, I have wondered if the temperature of the water did not have a good deal to do with it. I know the quadrimaculatus will breed better in warm water than in cool. Is it not possible that in California, which has a terrible climate—I nearly froze to death in San Francisco—the water is too cool to breed the anopheles quadrimaculatus?

Dr. John A. Ferrell, New York, N. Y.—I should like to inquire if, in the breeding places studied, attention was given as to whether or not the hydrogen-ion concentration had any influence on mosquito breeding.

Dr. Geiger (closing).—Dr. Hayne broupht up the question of the temperature of the water of the rice fields in California. In the Chico district the water used for irrigating rice fields is river water from the Sacramento so, ordinarily, it is cold, but the temperature in the rice fields there is favorable in comparison to that of Arkansas.

In Arkansas the work was done by the control of the human carrier and by screening, but we feel that malaria was entirely eliminated by control of the carrier.

SURGERY

RAILWAY, INDUSTRIAL, GYNECOLOGICAL, OBSTETRICAL AND UROLOGICAL

UNUNITED FRACTURES OF THE NECK OF THE FEMUR*

BY WILLIS CAMPBELL, M. D.,
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Non-union occurs more frequently in fractures of the neck of the femur than in any location in the skeletal system. This is thought to be due (1) to interruption in the circulation of the nutrient artery to the head, (2) synovial fluid inhibiting callus, (3) usual causes of non-union, that is, syphilis, interposition of muscle, etc., and (4) most frequently failure of anatomical reduction.

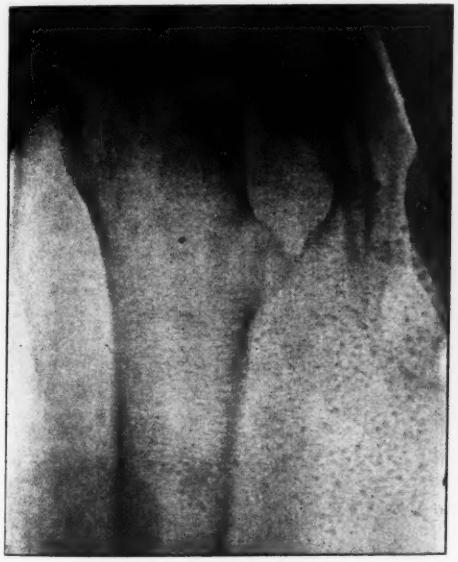

Fig. 1.—Showing complete absorption of head and distal fragment within acetabulum. Fair function.

The well-known disability is permanent and progressive, the entire extremity becoming an unstable, painful and almost useless appendage. In discussing this condition a thorough knowledge must exist as to the type, anatomical location and mechanics of fractures common to this region which differ materially as to prognosis.

1. Fractures of the base of the neck, trochanteric, intertrochanteric and subtrochanteric, unite readily.

Fig. 2.—Ununited central fracture of the neck of femur six months after operation. Perfect function.

2. Fracture of the neck where the distal fragment is within the acetabulum may give good functional result without bony union, a fact well worthy of note.

3. Impacted fractures may unite by simple rest in bed or any form of hip support.

*Read in Section on Surgery, Southern Medical Association, Thirteenth Annual Meeting, Asheville, N. C., Nov. 10-13, 1919.

4. Fractures of the neck proper, "central," is the only location where non-union occurs with a greater degree of frequency than other fractures. Until recent years no bony union was considered possible in the neck. This fracture alone is worthy of discussion, as fractures at other points in the vicinity unite as does any normal bone, and do not present a real surgical

Fig. 3, Case 1.—After operation, three months later, showing graft in position.

problem. This is clearly shown in my recent article, "Fractures of the Neck of the Femur: Report of 114 Cases," before the Orthopedic Section of the American Medical Association. Seventy were fresh fractures, 15 of which were trochanteric and united readily. Seven were impacted with the same excellent result. Seven below the trochanter gave firm, bony union. Five died (3 uremia, 1 pneumonia, 1 anesthesia). Six were too recent for consideration. Twenty-nine were central and were treated by the Whitman abduction method. Of these, 24 gave excellent functional result, by which is meant that the patient was able to walk without support, pain or discomfort and with every evidence of bony union, 4 failed, 1 result was unknown. Forty-four ununited fractures of the neck of the femur were observed all of which were central. Not one trochanteric or below subtrochanteric was found. From the history, 16 were treated by Buck's extension; 9 plaster cast, without regard to reduction; 4, Hodgins' splint; 9, sandbags; 2, osteopathy; 1, ambulatory; 5, no diagnosis, no treatment.

The successful management of ununited fractures of the neck of the femur requires early recognition of the condition and radical treatment. There is no conservative compromise if results are to be expected. If union has not occurred at the end of eight weeks nonunion exists. The term "delayed union" should not be used in connection with this fracture. Untreated and improperly treated cases do not unite and should at the end of five or six weeks be considered "ununited."

X-ray findings of all fractures are unreliable at the time when functional union is supposed to occur, but less so in this fracture. I have, on several occasions, seen apparently firm bony union as indicated by radiogram, disintegrate with complete separation. Conversely I have

Fig. 4.—Ununited fracture of the neck of femur one year after operation.
Note.—No absorption of graft, which is unusual.

seen apparent functional union with doubtful x-ray confirmation become gradually solid and stable after one year.

In old ununited fracture, absorption of head and neck is not so rapid as we are led to believe by the average skiagram taken in external rotation. Repeatedly I have

been pleased to find a well developed neck after two or more years when the limb is rotated inward. On the other hand, I have seen marked rapid absorption of the head. In one scarcely a trace of the head could be found at the end of two years, though walking was possible without support, as the neck was within the acetabulum.

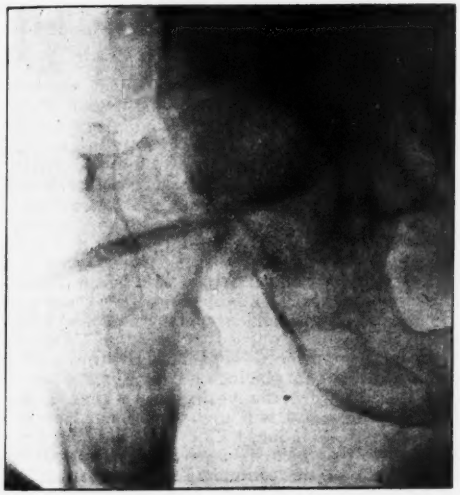

Fig. 5.—Ununited fracture of the neck of femur three months after operation.

The treatment depends entirely on the case in question. The operation of choice is undoubtedly the autogenous bone peg which may be taken from the tibia or fibula and inserted through the trochanter, neck and head. When conditions are unfavorable the anterior incision with freshening of the fragment may be omitted and the graft placed directly through the trochanter, neck and head with only a small incision over the trochanter. The graft can be inserted rapidly and accurately by x-ray control in the operating room.

In old or debilitated individuals nailing will give great relief by stabilizing even should no union occur, but it should only be employed in this type of case. When marked atrophy and absorption of head and neck ensues, which differs materially in individuals, union can not be expected and the head of the bone should be removed with insertion of the denuded trochanter into the denuded acetabulum. Retention is facilitated by removing the trochanter and attaching it to the shaft at a lower level. The object of this procedure is obviously stability through firm bony ankylosis.

In the young, simple paring of the edges with perfect apposition has been successful, but the bone graft is far more certain and should entirely supplant such a procedure.

Of 51 ununited fractures, 30 were selected for operation. In 7, the wire nail was driven through the trochanter, neck and head. Two were successful, 4 failed, 1 improved. In 20 the tibial graft was employed. In those of greater risk, the anterior incision was omitted and the graft used with practically the same technic as the wire nail. Of these, 14 were successful, 2 failed, 1 improved and from 3 we have not drawn conclusions. Grafts were not used where marked atrophy of the head was apparent. In 2, the head of the femur was removed and the distal frag-

Fig. 6.—One year later, showing graft in position with fracture united.

ment placed within the acetabulum. Both were successful. In 2 adolescents, simple paring of edges with forcible abduction proved effective.

The graft is absorbed, as we are implanting dense into spongy bone, but osteogenesis is stimulated by the living trans-

plant, whereas metal, boiled bone, ivory and other foreign materials inhibit callus formation.

In conclusion I desire to impress:

1. Importance of early recognition and operation, as excellent functional results may be secured in a large proportion of cases.

2. Do not attempt to graft into extremely atrophic areas.

3. In the aged and debilitated relief may be obtained by the wire nail with little if any risk.

4. Only radical procedures are of the slightest value.

5. From the above statistics this class of case, hitherto classed as incurables, can be given a more cheerful prognosis.

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DISCUSSION

Dr. William S. Baer, Baltimore, Md.—There are no cases which have given worse results than the ordinary treatment of the fracture of the femur. The cast, as a rule, does not work. We today must not only assure our patients so far as disease is concerned, but we must aim to give them as nearly a normal function as possible to that part. All the ordinary forms of extension, such as Buck's, fail to bring the part down far enough to allow the two parts of bone to come together. The adhesive straps will only stand about fourteen pounds of pull, and it takes more than that amount of pull to bring down the contraction of the paralyzed muscles so that there will not be the overriding of the head. So many of these cases never have an opportunity to unite because they are not brought into an anatomical position which will allow them to unite. The only form of treatment is the pull directly upon the bone.

In regard to the treatment of Dr. Whitman of bringing the leg in plaster with the direct rotation, that gives a far better result than the ordinary treatment by means of Buck's extension. But we must remember that we are trying to balance a pin on an apple, that the neck is small in comparison to the head itself, and almost always we get an eccentric action. The head turns either anteriorly or posteriorly, and even if we should be so fortunate as to get sufficient length by that treatment, we almost invariably get loss of motion from the fact of that rotating head. The operative procedure appeals to me as the only thing in cases of this type. Of course, we have to select the cases, but when there is no arteriosclerosis and no rise in blood pressure, the operative method is the only one to use. We must treat these cases from a prophylactic point of view. Prophylaxis is much better than cure. We must not act on ununited fractures of the head of the femur, but upon fresh fractures of the head of the femur. If we operate upon fresh fractures and bring them under proper control we can almost always get them to unite. After they are older, the autogenous bone transplant gives us the best results.

I wish to leave this thought. In the treatment of fractures of the head of the femur you should treat them from an operative point at the time you see them, and be very sure that you have a fracture of the head of the femur. Many of them are impacted and impacted fractures should always be unimpacted and then operated upon. If not, they will usually unimpact themselves and become ununited fractures later.

Dr. J. Shelton Horsley, Richmond, Va.—If I understood correctly, in one group of cases Dr. Campbell used grafts with about 80 per cent of successes, and in a small number of cases he used a nail, with success in only about 40 per cent. It may not be right to compare these two groups because in the nail group the patient could not stand the bone graft, but the relative effect of the metal and bone grafts is occasionally overlooked. Sometimes a Lane plate is placed on an ununited fracture of a bone. The iron is an irritant. If you put a plate on a bone and screw or nail it into place, within a week or two it is loose. If a nail is put into a soft tissue there is inflammatory reaction, which requires removal of the screw. Rigid bone structure containing lime salts, which are absorbed in order to loosen the insulating iron screw or nail is Nature's effort to extrude it. In placing a metal plate on an ununited fracture the very worst thing is done for it. The metal will always become loose and osteoporosis is induced. In the case the doctor mentioned, in which he used a single metal nail, he drove it in the center. The osteoporosis was in the center, and did not extend around the periphery, and in such cases it may be advisable. In using a bone transplant you have congenial tissue and, consequently, a deposit of lime salts and a strengthened union. That point should be borne in mind. The metal may be advisable in the case in which Dr. Campbell used it, but the biologic principle is wrong. Metal should not be used where there is an ununited fracture.

Dr. Campbell (closing).—I thoroughly agree with Dr. Baer regarding Buck's extension or Hodgins' in any type of fracture of the neck of the femur. In regard to impacted fractures I can not agree with Dr. Baer. I do not believe impactions should be broken up if they are real impactions. Many authorities, notably Cotton, say these should be handled very carefully. If it is so loosely impacted that by the least motion of the limb you are going to dislodge it, it is not an impaction. Unless you have rotation of the limb which may affect function later you know you will have a good limb.

As to operating early, that is a doubtful question. Sometimes I feel after the Whitman method that it might have been better to do the bone transplant earlier. I want to do a little more operative work in fresh fractures. My results in the Whitman method have been excellent. Out of twenty-nine cases I have had only four failures, which is not a bad percentage in fracture of the neck of the femur.

As to the nail operation, I feel that Dr. Horsley

is correct. I have had to remove these nails several years afterward. Not long ago I had to remove a nail from the case of a young lady. I did not operate originally on this case, but the nail was lying loose in an atrophic cavity. I only use the nail in the very aged, and in those in which I do not think it is possible to get a good result with the Whitman method. In the cases that are too old to operate upon by bone graft, the use of the nail is justifiable. I do not use it in the young cases for the reason Dr. Horsley has told you. The effect of any metallic substance is not good, and we certainly should not use it if avoidable. It is used solely for fixation. I have seen excellent results in these cases and improvement of function. Patients who could not move the limb at all have been able to lie flat on the back and raise the limb.

ANEURISMS*

By Edw. B. Anderson, M.D.,
Chattanooga, Tenn.

In a discussion of this length it will be impossible to go thoroughly into the literature on this subject and to give you the most recent statistics on the different operations for aneurisms.

The word aneurism is applied to a hollow tumor, space or sac, filled with liquid or coagulated blood or both, directly connected with the lumen of an artery. Arterial aneurisms are anatomically divided into the true and false types. The true are all of those in which one or all the tunics of an artery enter into the composition of the sac; the false, or spurious, those in which the sac is formed entirely by adventitious walls, that is, by newly formed perivascular connective tissue, in which organized clots participate in the wall building process.

The true aneurisma of the classic writers, in which the sac preserves the original three coats of the parent artery, is extremely rare, the middle coat disappearing in all well developed aneurisms.

The types of aneurism generally met with in practice are the traumatic and indiopathic. I believe that it is agreed that at least 75 per cent of all aneurisms are due to syphilis, and for this reason aneurisms are almost unheard of in the lower animals.

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Traumatic aneurisms are those which are clearly traceable to injury of the arterial walls by contusions, falls, gunshots, stabs, punctures and other penetrating wounds.

Pathologic or arteriosclerotic are those which are found without apparent cause and in which there is no distinct history of an injury to the artery. In those cases a Wassermann usually shows positive. For lack of space I shall not discuss the other types of aneurisms.

Early in the development of an aneurism the sac usually contains only fluid blood, and later on the clots are formed. In favorable cases the clot will be deposited in concentric layers until the sac is filled, thus excluding the blood stream and spontaneously curing the aneurism. Or it may fill up the sac circumferentially, leaving only a middle channel from the inlet to the outlet of the sac, thus virtually rendering the aneurism inert, the clot being merely canalized for the passage of the blood current.

In a few instances aneurisms have been recorded which showed no tendency to grow or develop. They have remained indolent for fifteen and twenty years. In the end, however, they return to activity, necessitating an operation. The natural tendency of an aneurism is to dilate and finally rupture. Three-fourths of all abdominal aneurisms end fatally by rupture. Death may be produced by an aneurism becoming infected and sloughing. An aneurism may be as small as a millet seed and as large as an adult head. The cases which I shall report in this discussion will prove this statement.

Ordinarily an aneurism may be diagnosed without the slightest difficulty, and on the other hand it may prove to be exceedingly difficult to know absolutely that you have an aneurism to deal with. An aneurism may be moved slightly in a lateral direction, not at all in a longitudinal direction along the axis of the artery. It is soft, compressible, elastic to the feel when it is of recent formation, hard and tense when it is old and filled with clot. A diagnosis can usually be made by the expansile pulsation, the bruit which is heard by the stethoscope, the fluoroscope and by the introduction of a very small

hypodermic needle and the withdrawal of real blood. The reduction in size and volume with arrested pulsation, obtained by compression of the main artery, is, of all the signs of aneurism, by far the most reliable and characteristic.

The regular tendency of an aneurism is to grow without cessation until it ruptures. Hence the necessity of treating them from the moment they are recognized.

Arterial aneurism is almost entirely a male disease (78 per cent). It is almost unknown in the lower animals, for the reason that they do not have syphilis, drink alcohol or dissipate generally. As Osler pithily puts it, "Venus, Bacchus and Hercules are to be recognized as the etiologic trinity in the causation of aneurism." At least 70 per cent of aortic aneurisms are due to syphilis.

In looking over the literature, it is encouraging to note the improvement made in the treatment of aneurisms. Formerly the risk of hemorrhage, shock, infection and gangrene faced the venturesome operator, and a frightful mortality followed in the wake of what were seemingly the simplest procedures.

There have been so many kinds of operations for aneurism that it is useless for me to attempt to describe them all. The ligature was the one first to be performed. Antyllus threw a ligature around the artery above and below the aneurism, opened the sac and turned out the contained blood clot, excised as much of the sac as possible and closed the wound. Ligatures have been applied above the aneurism, below the aneurism and on both ends of the sac. Hunter, in order to avoid ligating diseased tissue, ligated the femoral artery in Hunter's canal when dealing with a popliteal aneurism.

An operation which has received a great deal of attention is the excision of the sac, which is done by ligating both distal and proximal ends and then excising the sac just as you would an ordinary tumor. This operation has become the operation of election on the continent of Europe. The preliminary control of the main vessel is absolutely necessary to minimize the loss of blood on opening the sac, since in the vast majority of active aneurisms, esespecially those of the neck or at the root of limbs, numerous branches open into the sac which invariably bleed vigorously, even after the parent trunk has been well controlled on both sides of the sac. Thiel, in extirpating a recent aneurism of the femoral, in addition to ligating the external iliac above and the femoral artery above and below, had to ligate the external circumflex iliac, epigastric, profunda femoris, and also the vein accompanying the latter.

Adding to the difficulty of this procedure, there remain the different nerves to be identified and taken care of. This case serves to demonstrate that collateral circulation is a wonderful factor in saving a limb. It also demonstrates that the operation for the complete removal of an aneurism is not without its difficulties.

In looking over the statistics I was astounded to see the high mortality due to hemorrhage following the ligature. The ligatures evidently cut their way through the diseased arteries. One danger from ligature in the treatment of aneurism, especially in vascular regions, is that the stagnation which occurs in the sac is only partial. There are often currents which persist through the collaterals sufficiently long after the ligation to detach loose fragments of clot which block the peripheral arteries. Sometimes a thrombus may extend all the way from the iliac artery into the profunda or superficial femoral and block these vessels for several inches. Hence the present tendency to attack aneurisms by the direct route, either by extirpation or by open section. It is to Delbet's lasting credit to have demonstrated that there is less risk to the limb by obliterating an aneurismal artery at the diseased part than by creating two obstructions in the same artery, one at the point of ligature and the other in the coagulated sac.

The most ingenious of all methods (when applicable) is the intrasacular suture originated by Dr. Rudolph Matas. In this operation the sac is obliterated by a plastic procedure and the communication between it and the artery closed, while at the same time an attempt is made to preserve the lumen of the artery. The operation is performed by placing a Crile clamp at the proximal and distal end of the aneurism, the sac is incised and the clot removed, and

the entire sac made perfectly dry, if possible. You then introduce a soft catheter into the distal and proximal openings and place your sutures while the guide is in position. The sutures are all tied except two or three in the middle. These are drawn to one side and the catheter removed. Then the remaining sutures are tied. After all these procedures obliteration of the remaining portion of the cavity of the aneurismal sac is effected by approximating its walls by successive layers of sutures.

So much for the different operations thus far described. I am now going to offer for your consideration an operation which I have performed on two occasions with 100 per cent recovery. The operation is done without a single ligature or suture. I can only recommend it in great emergencies such as the two cases represent.

One was an aneurism of the external iliac, the other of the subclavian. They were immense in size. The first case required six square yards of gauze to fill the sac completely, while the other required four square yards of gauze to complete the tamponade. The operation is performed by making an incision in the distal end of the sac just large enough to admit the gauze packs, then with a dressing forcep at one end of the gauze and an ordinary hemostate at the other end of each piece of gauze, pack the sac firmly until all hemorrhage ceases. Leave the end of each gauze pack protruding so that it can be removed in sections.

The gauze should not be disturbed until about the tenth day, when the exudates begin to liquify or soften. Then it can be removed without any force or effort on the part of the attendant. Then remove a small piece of gauze each day until you have removed the entire pack, which should be within ten days after the removal is begun. The first piece of gauze used in the packing should be the last to be removed, when the sac, by its own centractile power and the granulations, has completely disappeared.

The differentiation is very important, as so many errors in diagnosis are made. Some of the most dramatic episodes recorded in surgical history are connected with just such mistakes. Eminent surgeons, like Deault, Pellatan, Boyer, Pirigoff, Holmes, Kuster and a host of others, too numerous to mention, have given proof by their mistakes of the extraordinary difficulty attending the diagnosis of some of these aneurisms. An aneurism may be mistaken for a bunch of enlarged glands in the neck. They simulate an aneurism by the carotid pulsation. Cold abscesses may be mistaken for aneurism.

When an aneurism inflames, the peraneurismal tissue quickly participates in the phlegmonous process, the skin reddens, becomes edematous and infiltrated, hot and tender to the touch. The outline of the aneurismal sac is lost in the swelling and can not be felt through the swelling. Temperature is present when the sac is infected and the pulsation has ceased. It is easy, then, to fall into error and plunge a knife into a supposed abscess cavity as I did in 1909. The case was as follows:

A patient was brought into the operating room with a diagnosis of psoas abscess. The abdomen was opened, the tumor was surrounded with gauze and a free incision made. A great gush of blood made the diagnosis easy. I quickly packed the sac with six square yards of gauze and the hemorrhage, to my delight and surprise, stopped. I removed this gauze in the course of two weeks and the patient left the hospital in four weeks. Upon his arrival home he noticed a piece of gauze protruding through the incision in the abdominal walls. This proved to be a piece of gauze which had been left in the sac when packing the sac at the time of operation. The patient threatened to bring suit against me, but I assured him that that piece of gauze had intentionally been left in the sac and was responsible for his good recovery. I saw this man a few days ago and he was enjoying perfect health—ten years since he was operated upon. This case was due to a gunshot wound.

Case 2.—In February, 1919, a negro man was admitted to the Charity Hospital in Chattanooga with an aneurism of the right subclavian artery. This man had a four-plus Wassermann. The aneurism was an immense one and several of our best surgeons abandoned the case rather than attempt to do a mutilating operation. I had in mind the case just reported and asked to have the case assigned to me. My request was granted. The usual incision was made and the clavicle detached from the sternum in the hope of being able to ligate the subclavian in the first division. While manipulating, the sac ruptured near the origin of the subclavian and a terrific hemorrhage had to be stopped by packing two yards of gauze into the opening in the sac. The cavity was not filled with the gauze pack. Only enough gauze was used to act as stopper, so to speak. The radial pulsation was not even cut off.

I sent the patient back to his bed and five days

later, when he had recovered from the shock from this procedure, I operated again. I had to remove the gauze which had previously been inserted into the sac and at the same time make another incision at the distal end of the sac. This time I completely filled the aneurimal sac by using four square yards of gauze. The hemorrhage was completely controlled. The reason I did not pack the sac firmly at the first sitting was that the opening was too near the innominate artery and I was afraid that in removing the gauze so close to the innominate I would cause a secondary hemorrhage. I did not attempt to remove any of this gauze until after the tenth day, and it was four weeks before I had removed all of the gauze in sections. Perhaps I could have removed it in two weeks. I ligated the axillary vein. I do not believe that this should have been done.

The aneurism was of such immense size that there was much pressure on the cervical and brachial plexus, causing paralysis of the entire upper extremity. For two days I almost despaired of saving the arm on account of the slowness of the collateral circulation in becoming established. After forty-eight hours the circulation improved very rapidly, but the innervation did not show any improvement until I began to remove the gauze packs ten days after the second tamponade.

It is plain that the bleeding from the orifices that opened into the sac was avoided when the orifiices were sealed by plastic exudate or organized thrombi. While obliteration of the orifices by thrombi or exudates can take place very quickly (within a few hours or days) it is evident that no dependable hemostasis can be expected until complete organization of these exudates or thrombi has taken place. The organization of a clot, or exudate, can not be expected to occur until at least twelve or fifteen days have elapsed after the tamponade of the sac. At the end of the second week organization of the clot should have begun, but this can only be recognized by the presence of granulation tissue.

The time for the removal of the pack may be hastened by a premature detachment of the gauze, but it is safe to wait until granulations are plainly visible in the edges of the wound, or when you can find a portion of the gauze that you can remove without any exertion. Within two weeks the gauze becomes thoroughly saturated with the exudates and it is not difficult to remove it. Be sure to save the deeper pack for the last act.

After the removal of the last piece of gauze it was necessary to insert a very small piece of gauze for a few days. The tumor had almost entirely disappeared and instead of having a gauze pack to hold the hemorrhage, I had a solid wall of granulation tissue. And there was no ligature surrounding the vessel to cut through and cause a secondary hemorrhage.

Case 2 was given several intravenous injections of arsphenamine and made a splendid recovery. The only bad results he had were due to the first operation when I attempted to do a ligation.

I contend that it was better to have treated this case in the manner above described than to have ligated the innominate artery, and I believe that the iliac aneurism treated by the same method was preferable to a ligation of the common iliac. Both cases were of such immense size and such character that I doubt that any other procedure would have given as good results. It is certainly the simplest of all methods yet employed, and a man does not have to be a Matas or a Horsley or a Wyeth to do it.

It is true that you seemingly lose a great deal of blood, but when you stop to consider, you have not lost as much blood as it at first appears, for the large sac is nothing more nor less than a reservoir, and the patient has been weeks or months in storing up this amount of blood. It should not be charged up against him.

It would be well at the beginning of the operation to bleed him into his extremities by cording the thighs just tightly enough to let the blood into the limbs and tightly enough to prevent it from returning into the body. I would also suggest that you lay a bag of shot or sand on the distal end of the aneurism for several days prior to the operation in order that you may help to establish collateral circulation.

I recommend this procedure only for such emergency cases as these two represent. One physician reported a case of aneurism on the hip of a patient and for the reason that he did not know the origin of the aneurism he did not operate. Of course, this was from a branch of the internal iliac. To have performed any operation it would have been necessary to open the abdomen and throw a ligature around the common iliac to control the hemorrhage while dealing with the gluteal aneurism. With this procedure he could

have opened the aneurism and packed the sac firmly and cured his patient easily.

Just as a matter of record, I shall report a case of arterio-venous aneurism of the right subclavian which I did in 1908. This was of traumatic origin. I ligated the artery in the third division and also the axillary vein. I saw this patient five years after the operation and he was in perfect health.

Then I have another case which I think will be of interest, as it is one of multiple aneurism, necessitating amputation, and should be recorded as a rare example of the aneurismal diathesis.

The attending physician reports that this young man now has over one hundred aneurisms. They are very small in size, of course. The man is a machinist by trade. The Wassermann reaction is four-plus, the entire arterial system markedly sclerosed. The patient was admitted to the hospital August, 1916, with radial aneurism. The radial artery for four inches above the aneurism was practically solid, which made it impossible to do any operation but the simple ligature just above the aneurism, and the free incision of the sac to let out the clot. The patient was given several doses of arsphenamine and made a good recovery as far as the aneurism was concerned.

In August, 1917, this patient was rushed to the hospital in a state of collapse, with a diagnosis of hemorrhage in the abdomen, as he had complained of a severe pain in the region of his liver before he became unconscious from the loss of blood. His abdomen was quickly opened and at least two quarts of clotted blood were removed. A very perceptible oozing was seen welling up in the right lobe of the liver. The hemorrhage was controlled by two mattress sutures and a gauze pack. It was undoubtedly from a branch of the hepatic artery and represents the third such case recorded. The patient made a good recovery and with specific treatment gained thirty pounds in four months.

In May, 1918, the same patient was admitted the third time for aneurism of the tibial artery. The aneurism ruptured before he reached the hospital. The aneurism was packed with gauze and gradually removed. No further surgical attention was given at that time, but the patient remained in the hospital four months and was treated by Dr. Meacham, who had referred the case to me on previous occasions.

February, 1919, was the fourth admission to the hospital. The diagnosis was gangrene of all toes on the left foot, due to endarteritis. Amputation of the toes was necessitated. In March another operation was necessitated by gangrene of the leg.

This patient's history, his radial aneurism, the hemorrhage in the liver, the aneurism in the anterior tibial artery, and the gangrene of his toes, and later his leg, caused by general arterial disease, makes it almost certain that the hemorrhage in the liver must have been the result of a rupture of a small aneurism of one of the branches of the hepatic artery. The fact that it occurred in the substance of the liver, and that it was controlled by parenchymatous sutures (two mattress sutures) and a gauze pack, would indicate that only a peripheral branch was involved. This is the rare and exceptional feature of the case, because, while the literature of hepatic aneurism is rich in the reports of cases in which the main artery or its branches have been involved, the aneurisms have rarely, if ever, developed in the hepatic substance where the vessel is well supported by the prolongation of Glisson's capsule.

Of course, whether the hemorrhage was the result of a ruptured (probable miliary) aneurism, or of a simple breakdown of an atheromatous artery, has not been determined. While the hepatic artery, or its branches, have been ligated eleven times, there are only two cases in which this ligation was done for aneurism of the artery or its branches (Kerr and Tuffier).

DISCUSSION

Dr. Lucian H. Landry, New Orleans, La.—Dr. Anderson's technic will not be discussed at this time nor any other technic. There is one point which was only touched by the essayist that is far more important than the technic employed in the operation, and that is a thorough study and understanding of the ability of the collateral circulation before any operative procedure is considered, because in the vast majority of cases you will have to depend upon the collateral circulation for the life of the distal part. As long as this is not done, you are leaving too much to chance and courting failure. We should know with some approach to certainty, whether in any given case the main artery of a limb may be suppressed with impunity or whether it may not. The ideal principle of preserving the parent trunk while suppressing the sac, unfortunately, can only be carried out in a very small percentage of selected cases and the extraordinary measures of venous and arterial transplantation, arterioplasties, patching of arteries, etc., must still be classed as uncertain, adventurous or heroic.

We have a very simple means at hand of determining the efficiency of the collateral circulation which was advocated and has been used by Dr. Matas with very gratifying results since 1910, the so-called hyperemic or color test, which consists briefly of the following, in aneurisms of the extremities. Taking a low femoral aneurism, for an example, a broad Esmarch elastic bandage

is snugly adjusted spirally from the tips of the toes to the upper level of the aneurismal swelling. After this procedure a specially made compressor is applied to the femoral artery just above the Esmarch bandage.

This compressor only has two points of pressure, one over the femoral artery and the other against the femur, leaving four-fifths of the circumference of the limb free. The compressor is tightened until all pulsation in the sac is absolutely arrested and the aneurism is stilled. With the finger of the operator constantly on the aneurism to make sure that its pulsation is absolutely controlled, the elastic bandage is held in place for five minutes, in old patients, and from eight to ten in young subjects. The elastic bandage is now quickly removed, while the compressor still secures the main artery. A waxy, cadaveric color will be observed in the foot and leg. Close attention must then be given to the returning hyperemic wave, and the progress of the blush is noted as it descends to the foot and toes. The blush, or returning living color, is timed as it appears in the leg, foot and toes. This is usually accomplished in from eight to ten minutes in a case with a good collateral circuit, but may be delayed to twenty minutes.

Should this phenomena be present, the aneurism may safely be approached, but in the event the color does not return in thirty minutes, it would be advisable to postpone the operation to a later date and endeavor to develop the collateral circulation by systematic compression of the main trunk for certain specified times.

If you have an aneurism, say of the popliteal, with no pulsation of the dorsalis pedis or posterior tibial arteries, and still a good living color to the foot (Delbet's sign) there need be no fear of obliterating the parent vessel, as this phenomena in itself proves conclusively that the circulation is being adequately carried on by the collaterals.

Dr. J. Shelton Horsley, Richmond, Va.—Dr. Anderson might do as Dr. W. J. Mayo does when he packs in gauze after removal of the spleen. Instead of leaving the incision open where the gauze is liable to displacement by pulsation of the artery, he might stuff the aneurism full and sew it up tight and remove the gauze afterward. In that way he will avoid secondary hemorrhage and do away with infection from the skin.

The question of aneurism is not so prominent now in surgery as it has been. It is possible that the early diagnosis and treatment of syphilis has done away with many potential aneurisms. I do not think we see so many as we used to, and we do not often read about them in the literature.

The question of curing the aneurism is very important, but it is essential to find out the nutrition of the limb after obliteration of the aneurism. If it can be shown to be sufficient it is well to proceed at once, but if it is insufficient, the use of heat will be of great service. In the development of the blood supply from a long flap you will almost certainly get gangrene if you turn it up at once, but cut off the distal end a little at a time and more circulation will be gradually developed in the pedicle, so that after ten days or two weeks you can be sure of a good blood supply. Reducing the arterial current to such a point that a very small stream goes through the aneurism may be curative. If not curative, it will develop a collateral circulation. Developing the collateral circulation is just as important as the operation itself. There are probably some cases in which the circulation can not be developed satisfactorily. In such instances the aneurism may be excised and a segment of the saphenous vein sutured in its place, but this would be rarely indicated. Being very much interested in blood vessel surgery, I try to face these situations fairly—try not to ride a hobby too hard. The more I see of aneurisms the smaller seems to be the field for blood vessel suturing.

I think too frequently we conceive arteriovenous aneurisms as the ordinary sacculated aneurism. I have heard it said, "Why you would not cut off the vein, for that would be fatal to the circulation of the foot." In the arteriovenous aneurism the vein is filled with arterial blood and the arterial blood goes down to the nearest value that can not be broken down by the force of the arterial circulation and so puts the vein out of function as a vein. I have found that in a few cases if the arteriovenous aneurism is dissected as close to the lesion as possible and then one puts on the artery above and below a ligature, and a mass ligature behind or an "X" ligature of heavy catgut that will go under, above and below the lesion the circulation is effectively shut off from the aneurismal opening and the collateral circulation is not greatly interfered with.

Dr. Herman B. Gessner, New Orleans, La.—Three types of operation are described by Dr. Matas. In all of them the temporary control of hemorrhage is the first step. In the limbs a constrictor is used; in the neck a loop of silk is applied on the cardiac side. In aneurisms with one opening (sacciform type) the restorative operation is done, and after the sac has been opened the Single orifice is closed by suture.

Another type of operation is the obliterative. That is applied to the fusiform aneurism. What we mean by a fusiform aneurism in surgery is an aneurism with two openings. After the sac is laid open each of the two openings is closed and any collateral opening found is closed. That is the commonest type of endoaneurismorrhaphy.

The third type is what is called the reconstructive operation, which I understood Dr. Anderson to refer to as the typical Matas operation. That has been done less often than the other types and done with less satisfaction, because when you ask a vessel to carry a blood supply that is too much for its resistance the result is disappointing. In that operation you pass a line of sutures over a rubber tube guide, the ends of which lie in the two main openings of the pusiform aneurism. The result of this reconstruction is to throw the strain of the blood pressure upon tissues that are unfitted to stand it. Dr. Matas recommends it for one type of case only. In those cases where the collateral circulation test is unsatisfactory he uses this method for building it up. With this type of operation the collateral circulation can develop.

The principle of the method shown by Dr. Anderson is not unknown. It is a good temporary

measure, but I believe not to be compared with the deliberate closing of the opening in the sac.

It is interesting to see how long surgeons have gone on opening aneurisms for abscesses. It happened in my service last year. An assistant, and a good one, thrust a knife into an aneurism and was surprised to see a clot instead of pus. There were reasons for this. The patient had signs of sepsis, had a high temperature, a leucocytosis. Pulsation was absent. He got out of the difficulty by stopping the hemorrhage with gauze. Then he was induced to go on to a more radical operation by suture. The result was that the patient died on the table.

I had the opportunity once of dealing with a varicose aneurism of the femoral. It was made easier by finding the artery accompanied by venae comites. I incised the one that was involved, sutured the opening of communication, and obliterated the vein.

Dr. Anderson (closing).—I have recommended this procedure only in great emergency cases, such as they represent.

When I did the first operation by this method in 1909 I wrote to Dr. Matas, and he wrote me that he thought this experience was entirely unique and advised me to report the case. He made mention of this case in Keen's surgery.

In cases of innominate aneurisms it is impossible to do the Matas operation without provisional hemostasis and it is a formidable operation.

As I said, it is a simple procedure and gets you out of difficulty more easily than any other method that I know.

The gentleman who stated that Symes did all of his cases like the two referred to in my paper after the method employed by myself is mistaken, as Symes did his operation by freely incising the sac and quickly inserting the finger so as to plug the afferent vessel. He then caught with a forceps through the cavity of the sac, the mouth of the vessel, and passed a suture around the mouth of the vessels that opened into the aneurismal sac.

In the cases which I report there is not a single suture employed. The point that Dr. Landry mentioned in regard to making sure that the collateral circulation is established, is good and should be emphasized.

OVARIAN FUNCTION FOLLOWING HYSTERECTOMY*

By Edw. H. Richardson, M.D., F.A.C.S., Baltimore, Md.

Within recent years problems relating to the conservation of ovaries in pelvic operations have come again conspicuously into the foreground of gynecological thought. This has resulted primarily from intensive study of the whole group of endocrine glands, and from discovery of the vital interdependence now known to exist between different units of this system. Formerly the discussions with reference to conservative versus radical pelvic operations were concerned mainly with the problems of infection, of the preservation of the reproductive and the menstrual functions, and with operative technic. But, through the remarkable growth and development of endocrinology, we have come now into possession of additional knowledge regarding ovarian function which introduces new considerations of vital importance into the problems of pelvic surgery. We have learned that the ovaries are not merely simple structures designed by nature for a single purpose and operating within a restricted physiological zone, but that they are complex glandular organs possessing, broadly speaking, a dual role of equal and fundamental importance. One of these controls the sexual and reproductive phenomena, while the other, through its intimate connection with the endocrine system and the elaboration of one or more specific internal secretions, exercises a profound influence over the body metabolism far afield from the genital domain. Before determining the fate of ovaries in a specific case, therefore, either through the application of surgical procedures or of physical therapeutic agents, like roentgen rays or radium, intelligent judgment demands familiarity with the details and mechanism of ovarian function in both of these general directions. Moreover, emphasis of the essential facts by those specializing in this branch of medical science appears to be both timely and desirable now because there is danger of the profession at large being misled by the teaching of a small group of eminent but radical gynecologists who are dogmatically advocating total ablation of both ovaries in every case of whatever age where hysterectomy is required.

In a paper read before the American Gynecological Society in Philadelphia in May, 1918, and published in its proceedings, I presented a collective and detailed review of the evidence for and against retention of ovarian tissue in connection with surgical removal of the uterus, in which I

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pointed out the fallacy in the argument of those advocating indiscriminate total ablation. It would be inappropriate and an imposition to burden a mixed gathering of medical men with such a detailed and highly technical analysis. My purpose now is to submit for your consideration certain facts in support of two propositions: (1) that the uterus is not essential to a continuation of normal ovarian function, except as regards menstruation and reproduction, and (2) that the ovary possesses extra-genital functions of paramount importance in the body economy, which are capable of operating quite independent of the uterus and which alone should suffice to insure its conservation whenever this is practicable. In order that we may fully comprehend the scope and complexity of ovarian function, it is essential to familiarize ourselves with certain facts, now scientifically established, regarding the epithelial constituents of the ovary. These, you will recall, consist primarily of varying numbers of Graafian follicles, with their contained ova. Secondarily, and originating from these, are the corpora lutea and the degenerated or atresic follicles. The ovum itself appears to possess at least a two-fold function. Upon its vitality depends the life of the follicle epithelium from its earliest development on to atresia. So, too, the formation and development of the corpus luteum depends upon the maturation and expulsion of the ovum. In addition to these fundamental influences upon ovarian elements, the ovum possesses the all-important function of reproduction of the species, which process begins only after fertilization with the male element.

The corpus luteum is the most conspicuous element of the ovary. Its morphology and development from the collapsed follicle following rupture and expulsion of the ovum have been exhaustively studied and described in detail by a number of investigators and need not be repeated here. But it is important to emphasize two facts which have been established through these intimate histological studies. One is that the corpus luteum undergoes constant change from day to day in its structure and appearance, first progressive and later regressive in character, indicating, of course, functional activity of a cyclic type; the other is the remarkable prolongation of the life of the corpus luteum during pregnancy.

Relatively few follicles go on to full maturity, rupture, expel the ovum and terminate in corpora lutea. The vast majority of them undergo varying degrees of development usually approaching maturity, followed by gradual disintegration of the ovum and granulosa cells. Simultaneously the cells of the theca interna enlarge, become epithelioid in appearance and persist for a considerable time in many species of animals, but in woman this occurs only during pregnancy. These are the so-called "interstitial glands."

Now since numerically, at least, atresic follicles constitute the most important epithelial element in the ovary, and, further, since they appear to play no part either in menstruation or in reproduction, our ignorance regarding their function itself furnishes a strong argument for ovarian retention after hysterectomy.

Concerning the physiological interdependence of the ovaries and the uterus and the evidences of ovarian influence strictly within what we may conveniently call the genital domain, we are now in possession of considerable knowledge, thanks to the recent researches of a number of workers. Thus, it has been shown that cyclical changes recur with methodical regularity both in the ovaries and in the uterus and, further, that a definite correlation undoubtedly exists between these respective phenomena. In the ovaries there occur in orderly sequence (1) follicle ripening, (2) ovulation, and (3) corpus luteum formation. Co-ordinated with and dependent upon these ovarian changes there occurs in the mucous membrane lining of the uterus an equally interesting and orderly cycle consisting of (1) premenstrual hypertrophy and hyperplasia, (2) menstruation, and (3) regressive changes, followed by a period of inactivity or rest. The evidence appears to be conclusive that these changes in the endometrium are brought about through the specific action of chemical substances furnished by the corpus luteum. This remarkable structure, furthermore, has been definitely shown to inhibit ovulation, and by so doing it prolongs the sex cycle in lower animals. During

pregnancy the life of the corpus luteum is greatly prolonged, and it has been shown to be essential to the early part of pregnancy, since it has a sensitizing action on the uterine mucosa, without which the ovum is unable to implant itself thereon. In all mammals there is a striking coincidence between follicle ripening and the period of heat, which strongly suggests a stimulation of the sexual mechanism by a specific secretory product.

This whole group of important cyclical phenomena, let it be clearly understood, which are participated in by both the uterus and the ovaries and which are physiologically interdependent, are concerned primarily with menstruation and reproduction. For their normal operation integrity of the uterus as well as of the ovary is obviously essential. So that if these phenomena embraced the whole of ovarian function, there would be, of course, no reason for retaining ovaries where removal of the uterus is required. But such is not the case. On the contrary, there remain for consideration the evidences of extragenital ovarian functions which proceed quite independent of the uterus and which are not influenced even by the surgical removal of that organ.

Thus the normal growth and development of the generative tract, together with that of the whole group of secondary sex characteristics occurring at puberty, are known to depend largely upon trophic influences of the ovary. Likewise, we know that ovarian influence controls the development of the mammary glands and is responsible also for the cyclic changes which they manifest. Furthermore, abundant evidence, both experimental and clinical, is available to establish incontrovertibly the intimate and vital connection of the ovaries with other units of the endocrine system. Particularly is this true of the pituitary gland, the thyroid gland and the adrenal glands. The frequent association of menstrual disturbances, of defective genital development and of sexual impotence with certain primary diseases of the hypophysis cerebri is familiar to us all. So, also, is the fact that the onset of puberty is commonly accompanied by enlargement of the thyroid gland, which is usually transient, and later recedes. There is probably a slight enlargement of the thyroid gland even during menstruation, certainly a temporary increase in its vascularity. Again, with the onset of the menopause there is ushered in a complicated symptom complex, many features of which are identical with the clinical syndrome indicative of thyroid disease *per se*. During pregnancy there uniformly occur profound and easily demonstrable thyroid gland disturbances. On the other hand, congenital deficiency of the thyroid gland is often associated with subnormal gonad development and with absence of the secondary sex characteristics. And associated with both hyper- and hypo-thyroidism we frequently observe disturbances in menstruation, in certain cases amenorrhea, and in others excessive flow. Less convincing but highly suggestive are the observations pointing to a possible functional interrelationship between the ovaries and both the parathyroid and pineal glands. The same may be said of the possible part played by the ovaries in the general metabolism of the body. Certainly no one can at present deny the possibility, at least, of the participation of ovarian influence in these several directions also. Finally, the equilibrium of the nervous system in the human female, both in the psychic domain and particularly in that of the autonomic constituent, depends exquisitely upon the integrity of the ovaries, a fact perennially impressed upon us by the vexing group of psychoneurotic symptoms as well as the formidable list of functional disorders of vasomotor, cardiac, gastro-intestinal, urinary and endocrine origin, which we are accustomed to associate with menstruation and with both the physiological and the artificial menopause.

Although incomplete, this brief summary suffices to emphasize the scope and complexity of ovarian influence outside the genital domain. It only remains to consider to what extent, if any, this influence is discounted through surgical removal of the uterus. I have made a careful study of the recorded data bearing upon this question. From anatomical studies a point of great practical importance has been established, namely, that the blood supply furnished the ovary through the uterine artery and the drainage from the

ovary through the uterine veins are necessarily cut off by hysterectomy; that the only possible collateral circulation must come through the anastomosis of branches from the uterine and ovarian vessels within the mesosalpinx; that, therefore, the danger to the ovarian circulation is tremendously increased through removal of the Fallopian tubes along with the uterus; and that where this is necessary every possible care should be exercised to stick close to the tube and neither to clamp nor ligate a single millimeter of the mesosalpinx beyond what is absolutely required. Failure to appreciate this anatomical fact is undoubtedly responsible for a large percentage of degenerated ovaries following hysterectomy.

From subsequent gross and microscopic studies of ovaries retained after hysterectomy, it has been shown that when degeneration occurs it is to be attributed either to associated ovarian disease or to damaged ovarian circulation or to both of these factors.

Through numerous experimental studies the theory of an essential physiological interrelationship between the uterus and the ovaries has been completely demolished, and it has been conclusively demonstrated that ovarian function, except in so far as it operates upon the uterus, may proceed uninterruptedly after hysterectomy.

Clinical studies both of series of total ablation cases and of ovarian retention cases have been on the whole unsatisfactory and have led to conflict of opinion regarding the value of the conserved ovary. This is due to the fact that no such studies have been undertaken with proper regard for all of the various factors which in reality determine the fate of retained ovaries, and without knowledge of which one can not possibly estimate clinically with any degree of accuracy to what extent hysterectomy has disturbed their function. These factors are: (1) a knowledge of the individual patient's condition prior to hysterectomy, both in the psychic domain and in that of the autonomic nervous system; (2) the cases must be grouped according to age both at the time of operation and at the time of subsequent observation; (3) they must be further grouped according to the pathology for which the operation was performed, including a careful descriptive note on the condition of the retained ovary; and (4) the operative technic must be recorded with sufficient detail to permit accurate determination of whether or not proper measures were employed to safeguard subsequent ovarian circulation.

As far as it goes, available clinical data is overwhelmingly favorable to ovarian retention, but we need in this category more scientific observations along the lines suggested.

In conclusion, I wish to state, with all the emphasis of which I am capable, my uncompromising opposition to the teaching that ovarian function *in toto* is disrupted through surgical removal of the uterus, and to say that I believe such teaching, from whatever source, to be dangerous and without scientific justification. And I wish to go on record as condemning the removal of one or both ovaries at any age simply because hysterectomy is required.

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DISCUSSION

Dr. F. Webb Griffith, Asheville, N. C.—We all admit that the ovaries ought to be saved, but in the majority of instances, when the uterus has to be removed, the ovaries also have to be removed. In carcinoma of the cervix, most of us still feel that the ovaries should be removed. In inflammatory conditions the ovaries are usually involved and when we save them we do so at great risk of another operation in the near future. The life of the ovary, after the removal of the uterus by the average operator, I believe is short. This is due either, as Dr. Richardson has said, to interference with the circulation or to other causes. You remember that the circulation of the ovary comes partly through the infundibulopelvic ligament and partly from an ascending branch of the uterine. These two blood channels usually anastomose and when one is large the other is usually small. When the uterine branch is the large one and the uterus is removed, you can readily see that the nourishment of the ovary is impaired. In those cases where the tube is removed, even though by careful dissection you keep close to the tube, you have greatly endangered the blood supply of the ovary. Whenever the tube can be saved with the ovary, as in hysterectomy for myoma, it should be done to lessen the danger of interference with circulation. There was a tendency a few years ago to remove most of the ovaries. Then the pendulum swung back and we tried to save the ovaries whenever there was a possible chance of so doing, and as a result, many of our patients had to be reoperated, and that in turn caused us to become so radical that Dr. Richardson has seen fit to urge against this tendency. If at the primary operation the chances are even that the ovary will be-

come either atrophic, cystic or adherent, or remain a focus of infection, I believe we will be less apt to have a nervous patient if we relieve her of all pain and local symptoms by removing the ovary.

Dr. William T. Black, Memphis, Tenn.—We may have some nervous manifestations following the removal of the uterus, nevertheless they are not nearly so marked as when both ovaries are removed. Certainly they should be preserved in women who have not passed the menopause, and even after this physiological change has taken place, I can see no special reason for removing the ovaries unless we suspect malignancy, or there is some ovarian lesion present. It is very necessary where the ovaries are to be left in, in performing a hysterectomy, to leave the blood supply as much undisturbed as possible. When possible the tubes should be left and when necessary to remove them the incision should be as far away from the ovaries as possible. It is also best to anchor the ovaries high up, so as to prevent a prolapse. The interrelationship of the secretions of the endocrine system is becoming so well understood that no one can remove a ductless gland without fear of disturbing metabolism to a certain degree. The function of the corpus luteum has principally to do with the function of menstruation and the growth of the fetus. Its removal doubtless would make little difference. But the removal of the remaining portion of the ovaries always seriously interferes with the proper balancing of the internal secretions. I therefore wish to disagree with some of our best authorities upon the removal of the ovaries where it is necessary to remove the uterus.

Dr. Richardson (closing).—I do not agree with Dr. Griffith when he says there are only occasional cases in which the ovaries can be saved. On the contrary, there are a great many cases in which the ovary can be saved if we will take the trouble to do it. The assertion that these retained ovaries often undergo secondary changes which require their removal lacks scientific proof. I have been doing gynecology for fourteen years and have rarely seen the abdomen reopened for removal of ovaries on account of degenerative changes following hysterectomy. I do not believe it is necessary to remove the ovaries even in the operable cases of carcinoma of the cervix. During a period of nearly two years' apprenticeship in gynecological pathology in the Johns Hopkins Laboratory I saw metastasis in the ovaries only twice, I think, and these were instances of most advanced carcinoma of the cervix, where the growth had broken through and studded the pelvis. Nor do I know of a case in the literature in which metasasis was demonstrated in the ovary where the cancer of the cervix was still in the operable stage. I have two cases now in which I operated five years ago for carcinoma of the cervix; the women have been examined regulary at six-month intervals and the ovaries are perfectly normal. In one case of cervical carcinoma of a fairly advanced stage, operated upon several years ago, I saved both ovaries and was delighted to demonstrate on reopening the abdomen recently that both of these ovaries are functioning properly, and that there is no sign of carcinoma in either one. I think, therefore, that unless you have a specific, demonstrable disease of the ovary at the time of operation, no matter whether the woman is under the menopause age or over it, the burden of proof is with the operator to justify total ablation.

DIVERTICULUM OF THE POSTERIOR URETHRA*

By G. T. Tyler, M.D.,
Greenville, S. C.

For some time after I had observed the case I am to report, I was uncertain what to call it. There was a pouch in the floor of the posterior urethra just anterior to the internal sphincter. This was a diverticulum, to be sure; but it might with equal propriety be called a dilatation of the prostatic glands in this region. I had not seen accounts of such a condition in the literature on diseases of the prostate; and that on diverticulum of the urethra deals much more extensively with the condition in the anterior urethra. There is little on diverticulum of the prostatic portion.

The early age at which bladder stone formed in this case led me to think that if these diverticula were congenital they might explain the occurrence of vesical calculus in male children. Although it does occur more frequently in males, I have not been able to find data in support of this view. Again the difficulty of making accurate examinations in children has prevented such findings. Against this theory is the rarity of reported diverticulum with the occurrence of stone in the bladder. It is conceivable that diverticulum of the posterior urethra may be due to dilatation of the prostatic ducts. This view, I think, is tenable from the work of Lowsley on the prostate at birth. One might ask why it does not occur in the anterior or lateral wall, as well as in the posterior. I have no reply to this objection.

CASE REPORT

The patient, a boy, aged 16, having incontinence of urine, was sent to me because of swelling of the left testicle. One year previously both

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testicles had swelled, but had subsided on rest in bed. There was no urethritis, nor history of exposure with either attack. His previous history was that between the ages of 4 and 6 he had been operated upon four times for recurrent stone in the bladder. The first and third operations were perineal, the others supra-pubic. Following the third operation incontinence developed and persisted until admission. After his recovery from epididymitis, I attempted to pass a catheter into the bladder; but encountered an obstruction in the posterior urethra, which I could not pass until a finger in the rectum exerted pressure against the instrument. It then passed readily into the bladder. This procedure it was necessary to repeat on introducing the cystoscope. The appearance of the bladder was normal; the ureteral orifices and internal sphincter showed no defect; but just anterior to this muscle a pouch appeared in the floor of the posterior urethra. No endoscopic examination was made.

At operation through a supra-pubic incision the bladder was found normal. The perineum was opened and a pouch into which I could easily introduce the tip of a finger appeared, extending about 1.5 cm. deep. The internal sphincter separated this pocket from the bladder. I divided this muscle, converting the diverticulum and bladder into one cavity. The patient was temporarily improved, but soon had a return of incontinence. At a second operation two months later I attempted to dissect this pouch and to restore the floor of the urethra as nearly as possible to normal. He was improved for a longer period following this operation, but again incontinence returned.

A third operation was done six months after the second. Under local anesthesia the scar tissue was dissected and the perineal muscles were sutured over the urethra, a No. 16 French catheter being used as a guide. Unfortunately this wound broke down on the tenth day, some urine escaped, and a fistula persisted for three weeks, healing after a chromic catgut suture came away. No leak, however, remained; and the patient had almost complete control for two and a half years. The largest amount of wetting throughout the day would be an area the size of the palm of the hand. In the fall of 1918 he had a return of symptoms, and is seeking relief at another clinic.

The incontinence, of course, followed operation, and maybe the diverticulum also. But I have wondered whether this may not have been congenital and the stone have formed in it.

Gansen, in 1905, reported an autopsy finding in a male aged 54. There was a diverticulum in the floor of the posterior urethra 1-1.25 cm. anterior to the internal sphincter. It occupied the region of the colliculus; was 2 cm. long, 1.5 cm. wide, 1.25 cm. deep; and contained a stone. Escat also found a case of congenital diverticulum with a urinary pouch in the peno-scrotal region, communicating with the posterior urethra. He thinks this a partial persistence of Muller's duct. These two cases may be of the same origin. Escat reported another case with congenital narrowing and inversion of the anterior urethra and a cavernous membrano-prostatic urethra (congenital).

I have observed a diverticulum in the posterior urethra in a patient aged 30, having spina bifida. He has had incontinence since 8 years of age. There was no history of injury or operation. In the floor of the posterior urethra was a pouch from which pus escaped, especially while lying down. The pouch is near the internal sphincter. The outline of the prostate is normal. In this case also I was unable to enter the bladder with a catheter until I had inserted a finger into the rectum and pressed against the instrument.

Englander has reported several cases, one in the membranous urethra, some in the posterior, one of which was congenital. He also suggests that they may be responsible for stone formation.

Bumpus, of the Mayo Clinic, reported four cases, all of which were acquired. He cites some cases from Lane, autopsy findings. It is his idea that the condition is not congenital, but is acquired from injury, operation, or infection.

Von Girgalow found a diverticulum of the posterior urethra in a 5-year-old boy.

A history of dysuria, partial or complete, especially in the acquired cases, persistent urethral discharge, pain or swelling in the perineum, are usual symptoms. Recurrence of bladder stone, especially in the young; repeated attacks of epididymitis without urethritis, trauma, or tuberculosis, as in one of my cases, are significant. On examination, an obstruction in the posterior urethra to the passage of a catheter should suggest a pocket in this region. At this stage, gentle pressure over the prostate may express cloudy urine or pus from the catheter. Endoscopic examination will reveal the condition. Radiograms, especially with shadow-casting fluids, are important aids.

From the cases I have been able to review, congenital diverticulum of the posterior urethra does occur, but is not so frequent as the acquired variety.

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DISCUSSION

Dr. R. C. Bryan, Richmond, Va.—I am satisfied that this condition exists more commonly than we suppose. When we recall the rather complex biology of the urethra and its formation, when we understand that there is a powerful muscle which is cutting down on the urethra, constantly in a state of spasm, between the two layers of the triangular fascia, which again is most tense and resistant, I think we can understand how there is a constant resistance offered to the flow of urine at all times at this physiological point of constriction. I believe that 67 per cent of all men who have gonorrhea have the inflammatory reaction in the deep urethra. A pathological narrowing added to this physiological constriction is of just sufficient embarrassment to produce a bulging of the urethra posteriorly. This urethral dilatation occurs only on the floor for evident anatomic reasons. Women also have this condition, but I think it is not so common as in men. In *Surgery, Gynecology and Obstetrics* for this month there is an excellent article from the Mayo Clinic, which is the first I have seen on this subject. The insults to the floor of the urethra in women in childbirth may cause a proximal dilatation to the point of injury. In those cases which have been examined cystoscopically and do not show vesical diverticula, urethral diverticula should be thought of and an endoscopic examination carried out. I believe I have had one or two of these cases. I do not think I recognized them, but I think they will be recognized more in the future than they have been. I am satisfied that operation offers the only means of cure. I was interested in the doctor's paper and think we should all be more on the lookout for urethral diverticula than we have been heretofore.

Dr. E. G. Ballenger, Atlanta, Ga.—The nearest to a diverticulum I have seen was where the prostatic follicles were much dilated and partly filled with stones. This is not the kind of diverticulum that Dr. Tyler refers to, but it is only one that borders on that particular type which I have seen.

Dr. Tyler (closing).—I have recently been in communication with some of the pedriatrists, and have learned from them that there are additional reports in the literature showing that other cases of stone in the bladder during childhood with diverticula of the posterior urethra have been found. Any information we can get as to the cause of these cases should be welcomed. Although Dr. Bumpus thinks his cases were all acquired, the condition is certainly congenital also.

COMMON SKIN LESIONS RARELY RECOGNIZED

By C. Augustus Simpson, M.D.,
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There are three lesions in dermatology which always seem to confuse the average physician. This apparent perplexity is, to my mind, often due to neglect on the part of the diagnostician to observe a few fundamental points, the understanding of which will often be of great aid in making a diagnosis.

While the tubercular-ulcerative syphiloderm, lupus vulgaris and epithelioma are chronic, indolent lesions, there are certain phases of this chronicity which are most striking. First, lupus vulgaris is a disease of childhood, quite rare, develops very slowly, and is seldom of great extent, yet few late syphiloderms out of the ordinary escape the diagnosis of lupus. Second, it seems hard to convince many physicians that syphilis may occur as a single, ulcerated, slow-growing, indolent ulcer, in a man or woman past forty, on the lip, nose or other locations frequented by epithelioma. The lesion may be months developing and ulcerating, while a lupus of the same extent would require years. While the tubercular-ulcerative syphiloderm may occur as an isoated single lesion, it seldom remains as such for many months, but spreads at one border while healing on another, leaving its tell-tale scar in its train. A negative Wassermann often makes his doubts complete. Third, that the usual epitholioma has as its antecedent a mole, wart or seborrheic patch which has been present for years and years, maybe throughout the life-time of the patient. They do not change their locations and very seldom do they heal spontaneously to recur. Close examination with a magnifying glass may show a

crust, a bleeding point, or a tiny ulceration which means that we are no longer dealing with a mole or senile patch, but a skin cancer, either basal and prickle cell.

The subject of this case report is syphilis, which should be of some interest, because apparently all physicians in Washington diagnose and treat syphilis. I could report quite as many or more cases of lupus and epithelioma which have had Wassermanns and antisyphilitic treatment. All of the following patients were referred to me, some by doctors who make a specialty of syphilis, others by medical men adept in mercury therapy and intravenous injection. The diagnosis made, most of the patients were referred back to their respective physicians for treatment. All patients were diagnosed the first time they were seen—two were subjected to the Wassermann test in order to convince the physician who sent them.

CASE REPORTS

Case 1.—Maiden lady, 48 years of age, was referred to me by a surgeon. On her left cheek was an ulcerating lesion the size of a quarter. Close examination showed that the ulcers originated from three or four grouped tubercles which had ulcerated into one. The surgeon had diagnosed the ulcer as epithelioma, excised it with considerable loss of tissue and scar. The lesion promptly returned to the condition I describe. It healed in two weeks under mercury and arsphenamine therapy.

Case 2.—Man, 51, was referred to me for x-ray treatment with a diagnosis of epithelioma. He presented an ulcer the size of a half dollar on his right cheek just below the eye. The lesion had an irregular bleeding floor, elevated edges, all intensively inflamed by several applications of x-ray. The x-ray dermatitis persisted for some weeks, but the ulceration healed under two doses of arsphenamine.

Case 3.—Married, white woman, age 42, without children, had no history of miscarriages. Referred as lupus, she had two superficially ulcerated, irregularly shaped ulcers the size of a small lemon—one on the neck, the other on her forehead, of six years' duration. She informed me that eight physicians had treated her for lupus and skin cancer. On being told that she would be well the following week, she did not hesitate placing me in the Ananias Club. One intramuscular injection of arsphenamine in the buttocks healed her syphilis.

Case 4.—White man, aged 49, married eight years, three healthy children, was sent to me with a diagnosis of lupus. On his forehead he had an extensive, irregular, nodular, ham-colored lesion as large as an orange. He had consulted a number of doctors. His family physician, who treats a great deal of syphilis, had observed the lesion off and on for five years. Superficial, white, smooth cigarette paper scars interspersed with the nodules and ulcerations made the diagnosis quite easy. Three injections of arsphenamine cured the lesion.

Case 5.—White man, single, 38 years of age, was sent to me for x-ray treatment of epithelioma. He presented two isolated, round ulcerations, the size of an olive, one at the root of the nose and the other on the upper lip, of several months' duration. Both prompty healed under two injections of arsphenamine.

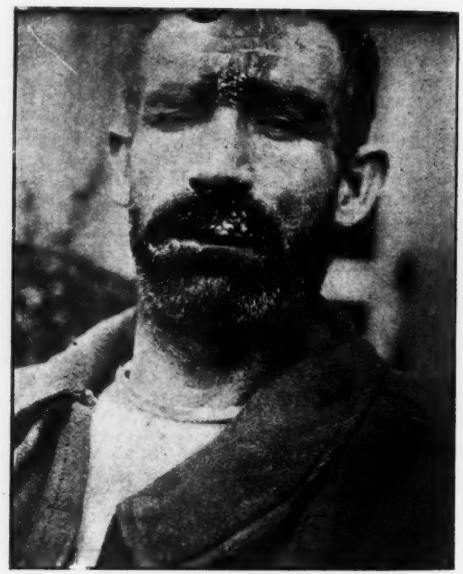

Fig. 1, Case 5.

Case 6.—White woman, 50 years of age, married, was sent to my clinic at the George Washington Hospital with the diagnosis of epithelioma. She had an ulcerating, nodular infiltration of the entire upper lip. These nodes were somewhat elevated, but for the most part were deeply imbedded in the lip tissue. Interspersed among the tubercles and ulcerating nodes were the telltale syphilitic scars. I exhibited this patient to a number of physicians, all of whom considered the case lupus or epithelioma. One physician said he would not venture a diagnosis, but would say it was not syphilis. The lesion rapidly healed under mercurial treatment.

Case 7.—White man, age 50, from Virginia, with the diagnosis of lupus, was referred to me for treatment. His lesions had been present and he had been under lupus treatment a number of years. During this time mercurial tablets had been given a trial. The lesions, as the cut will show, were two enormous tubercular-ulcerating lesions, one on the buttocks and the other on the shoulder. The irregular outline of the ulcerations and the central smooth scar show very well in the photograph. A few injections of arsphen-

amine quickly cured this long-standing condition.

Case 8.—White woman, 34 years of age, who had been under treatment for a rhinitis and beginning deafness, was referred to me by a prominent throat specialist. The diagnosis of erythema had been made of the patient. She presented well-developed nodules and a tuberculo-ulcerating syphiloderm. Three injections of arsphenamine cured the rhinitis and brought her hearing to normal.

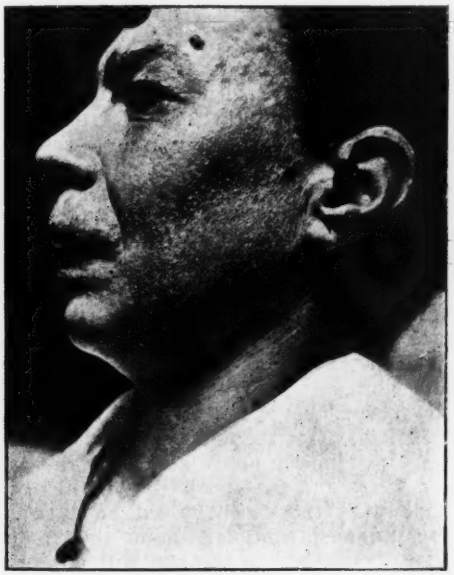

Fig. 2, Case 6.

Case 9.—Married white woman with one healthy child was referred to me by a throat specialist who was treating her for otitis and tinnitus, with pronounced deafness. She had a number of tuberculo-ulcerating syphiloderms in one palm and at the angle of both jaws. All lesions had been present for months. A few injections of arsphenamine healed the skin lesions and cured the deafness.

It seems that one should be able to make some constructive observation when reviewing a series of mistaken diagnoses such as these. I can not help feeling that the patient with skin lesions, be they lupus, epithelioma or syphilis, fails to get the intelligent advice that he hopes and pays for. While only one may be fatal, all may lead to extensive mutilation and permanent deformity. Regarding syphilis, I must confess that the Wassermann test has not been an unmixed blessing. In many of the late lesions of syphilis, the blood examination not only fails to help make a diagnosis, but oftentimes actually prevents one because of the sublime confidence the profession has learned to place in the test. In addition, it has led to lack of study and some carelessness on the part of the physician. The incentive to hard work and study for months and years under the great masters, where hundreds of these cases are to be seen, will cease when the short-cut laboratory diagnosis, often by the third party, can be utilized. I need not dwell upon the hopelessness of trying to master syphilis, the great imitator, by the perusal of the correspondence courses that come to us in the shape of books, plates and stereoscopic views.

Fig. 3, Case 7.

Examples of this are to be seen in many cities, instances of where pathologists and serologists who until recent years were content to confine themselves to their highly scientific and valuable branch of medicine have suddenly and without the least practical experience in syphilis, blossomed forth as specialists in the diagnosis and treatment of this disease.

Happily the American Medical Association recognizes the danger and shortcomings of such very questionable practices, and this great organization is making an effort to rescue syphilis—the waif of bodily ailments—and place it in the Section on Dermatology, where it belongs. It is now publishing all the literature of syphilis in the *Journal of Dermatology and Syphilis*. In addition, the recent meetings of the Association have very properly confined all papers, symposiums and discussions relating to the general subject of syphilis to the Section on Dermatology. The leading medical schools of America recognize the utter futility of teaching syphilis properly when the lectures of this great subject are hopelessly divided and duplicated among two or three specialists. They now either provide a separate chair for syphilis in charge of a dermatologist or confine the teaching of this disease to the chair of dermatology.

It is a mistake to imagine that the old school dermatologist will be able to assume this added responsibility without a broadening of his knowledge and views on syphilis. His perception of syphilis must be more than skin deep and he must learn to treat not only the skin lesions, but the disease.

While it is not necessary to be a practical serologist, one should at least understand the theory of the compliment-fixation test, and be able to interpret the four examinations made on the spinal fluid. An earnest effort must be made to become better acquainted with the renal, vascular and nervous complications of syphilis. It might be said that every serious vascular and nerve lesion is due to the failure of the patient to get intensive treatment in the early stages of the disease and that this fault lies in a great measure with the urologist and the dermatologist.

The urologist is becoming more of a surgeon and less a venereal specialist every day. Many of his leading and more modern text books do not have the large and amusing chapters on syphilis as in the past. This leaves the field to the dermatologist, not the dermatologist who has remained in the spore stage for the past ten years, but the specialist who has kept pace with the recent great advances in the diagnosis and treatment of syphilis, advances which in the last fifteen years have eclipsed the observation of centuries.

1219 *Connecticut Ave., N. W.*

EYE, EAR, NOSE AND THROAT

THE RELATION OF THE FIFTH CRANIAL NERVE TO AUDITORY-VESTIBULAR DISEASE*

By E. R. Carpenter, M.D.,
Dallas, Tex.

The work of Barnay on the vestibular apparatus has served to stimulate materially the otologist's interests in intracranial lesions. In fact, we now realize that the auditory-vestibular apparatus is implicated directly or indirectly in the majority of brain lesions, and that no neurological report is complete unless it includes a thorough otological investigation. This information not only furnishes valuable data as to the presence or absence of disease, but often it is invaluable for the localization of lesions.

Owing to the character of the auditory-vestibular examination, interpretation of the findings should be made by an otologist. The average neurologist or the brain surgeon has a rather poor conception of otology. As a rule, they underestimate the importance of the auditory report. However, reputable otologists do not claim to make intracranial diagnosis from isolated neurological findings, as no field in medicine presents more difficult problems for diagnosis than this work. After all available information bearing on the subject of brain lesions has been assembled in each case, we know that the neurologist frequently experiences great difficulty in arriving at a conclusion.

Since the otologist is concerned principally in satisfying himself beyond doubt as to the presence or absence of an intracranial lesion in each case of nerve deafness that presents itself, and since this information is not always assured from the functional ear tests, it is customary to investigate further as to the reaction of other cranial nerves. The seventh or facial nerve has a closer anatomical relation to the auditory nerve than the other cranial nerves, consequently, we should naturally expect this nerve to be most frequently involved along with the eighth nerve, but clinical facts do not bear out this claim. Although the seventh and eighth nerves are situated side by side, and they enter the internal auditory canal together, many observations have demonstrated beyond doubt that profound disease involving the eighth nerve may frequently leave the facial nerve undisturbed. This arises from the fact that the facial nerve is harder and more resistant to damage than the eighth, which is soft in consistance.

Almost any or all of the cranial nerves may be involved along with disturbance of the auditory-vestibular apparatus, but the second, third, fifth, sixth and seventh are the nerves most likely to be implicated. Of these, I especially wish to call attention to the frequency of fifth nerve involvement in intracranial ear lesions, and the importance of examining the reactions of this nerve along with the auditory-vestibular examination.

Anatomically, the central distribution of the fifth nerve is far more extensive than that of any of the other cranial nerves. The sensory fibers and neuclei of this nerve are found in the upper portion of the spinal cord, in the medulla, pons and upper portion of the brain stem. The fibers decussate in the medulla and pons, forming a network before entering the fillet. The motor portion of this nerve is of less importance to otologists, as it is less frequently involved than the sensory portion.

The sensory and motor roots of the fifth nerve enter the posterior fossa in close proximity to the auditory-vestibular nerve. The peripheral sensory distribution of the fifth nerve is through the middle cranial fossa to the face, forehead, cornea, conjunctiva, and to portions of the internal nose and throat, and to the tongue, teeth, eyeballs and meninges. The motor portion is concerned with the muscles of mastication.

The neuclei and fibers of the auditory-vestibular nerve in the medulla and pons are in close relation to the fifth nerve distribution in that region, consequently it is reasonable to suppose that these two

*Read by title, Section on Eye, Ear, Nose and Throat, Southern Medical Association, Thirteenth Annual Meeting, Asheville, N. C., Nov. 10-13, 1919.

nerves, the fifth and eighth, would be frequently involved together in disease of the posterior fossa. Clinical observation reveals this to be a fact, and my own experience leads me to believe that some disturbance in the reaction of the fifth nerve can be found in almost all cases of intracranial auditory-vestibular disease.

In a series of thirty neurological patients, where an intracranial disturbance of hearing was marked or where there was vestibular involvement of a similar origin, I found 80 per cent of these cases also revealed some disturbance in the reactions of the fifth nerve, whereas only about 10 per cent of the cases revealed indication of seventh nerve trouble.

Subnormal sensation of the cornea, or loss of sensation of the cornea, was most frequently met with, due no doubt to the fact that the corneal sensory neuclei are situated in the medulla near the eighth nerve neuclei. The sensory portion only of the fifth nerve was usually involved as the motor neuclei are small in extent and are high up in the pons. The motor root of this nerve appears to be in some way better protected from injury, as it passes through the posterior fossa.

Loss of taste over the anterior portion of the tongue on one side or on both sides is a frequent occurrence along with eighth nerve disturbance. Some authorities claim these taste fibers come from the fifth nerve neuclei, but anatomical evidence indicates they are from the seventh nerve. However, clinically, I have often met with loss of taste on one or both sides of the tongue where the entire fifth nerve was inactive on one side and there was apparently no seventh nerve trouble on either side.

Unilateral hemianesthesia and hemianalgesia, that is, loss of the touch and pain sense over the face and body on the same side, are occasionally encountered along with severe deafness. This condition strongly suggests some hysterical element, although I have seen it occur in organic brain trouble.

Neuralgia of the different branches of the fifth nerve, toothache, burning sensation in the mouth or nose, and other paresthesia, may occur in the ear patient. Many times the patient is not aware of the fifth nerve trouble, especially analgesia, although it may have existed for several weeks or months prior to the discovery of the trouble.

All forms of brain lesions occur in the region under consideration, that is, in the medulla, pons and posterior fossa. Syphilis, tuberculosis, circulatory diseases, acute inflammation, toxemias, injuries, tumors, abscesses, multiplesclerosis and other diseases peculiar to the nervous system may be met with.

Cerebello-pontile angle tumors and abscesses almost invariably involve the fifth and eighth nerve, and this may be the only symptom of such trouble early in the case.

The otologist should never be contented with making a diagnosis of nerve deafness, but he should determine whether or not the lesion is of intracranial origin. The prognosis and treatment depend on this point. The neurologist or brain surgeon may not be consulted until the disease has advanced too far to prevent deafness or loss of life, as often occurs with tumors, abscesses, syphilis, circulatory disease, toxemia, etc.

In Cushing's book, "Tumors of the Auditory Nerve," the sad fact stares us in the face that in every one of his thirty-five cases the first symptoms were disturbance of hearing, yet all of them came to him in an almost hopeless condition, being either paralyzed, blind, or nearly blind, or they had some other equally as serious complications, which even if they survived the operation rendered the operation exceedingly dangerous and the prognosis serious. In nearly all of these cases an early diagnosis would have offered a very good chance to escape the terrible complications and to have saved many lives.

SUMMARY

The otologist is not required to make absolute diagnosis of intracranial disease, but auditory-vestibular diagnosis has been developed until we can usually determine whether or not we are dealing with an intracranial lesion. This ability entails some knowledge of the other cranial nerves. The object of this article is to call particular attention to the importance of carefully considering the fifth cranial nerve in auditory-vestibular investigation.

306-11 *Southwestern Life Bldg.*

SPECIAL ARTICLE

THE MEDICAL TEACHER*

By Kenneth M. Lynch, M.D.,
Professor of Pathology, Medical College of the State of South Carolina,
Charleston, S. C.

Having been invited to present in this symposium a paper on medical education by a professor of pathology, I have taken it as my responsibility and privilege to select a topic dealing with problems of pressing importance to medical schools of this country today, with particular reference to Southern medical schools. I have consequently chosen what to my mind requires at the present time most careful consideration, the medical teacher himself.

During the recent period in which we have seen marked and needed improvement in medical education, attention in the main has been directed toward the prescribing of courses to the youth who intends to study medicine and to the medical student, and to the proper equipment of medical schools for the giving of these courses. As a general proposition, we see today the large majority of medical schools at least decently equipped and conforming in the main to well recognized principles in conducting their courses, particularly in the preclinical branches.

Teaching of the laboratory course has been pretty thoroughly investigated and overhauled and the teacher of these branches has been affected in that a sufficient corps of whole-time instructors has been insisted upon. The organization of our laboratory branches has been well done. They are now in a state from which we shall probably see no further radical changes, but a gradual progression with the natural changes and progress of the profession.

The main problem with which the proper direction and conduction of the laboratory branch is now confronted is the supply of efficient and capable teachers, and this is largely an economical problem. There are two sources from which we draw our supply of young men entering the field of laboratory teaching. Probably the majority of them are recent graduates who have not yet become settled in a particular line and use such a position as a temporary vocation or as a stepping-stone to something else. The minority is composed of those who are ambitious to pursue this course as a permanent profession. In the former case the neophyte rarely remains longer than a period of apprenticeship when he is a pupil instead of a teacher. The latter class is pitifully small, especially in the smaller schools. It is a small class principally because the remuneration which goes with it is not sufficient to attract men of ability, and if it were not for the fact that there are some who come for the love of the work the laboratory complement of the teaching profession would soon find itself in a state of stagnation and decay for want of ability and leadership.

Salaries of instructors in laboratory departments in Southern schools range from about $500 to $1,600 per year, the average being about $1,500 and the usual being about $1,000 to $1,200. Upon such a salary a man can no more than live in respectability, and marriage and support of a family is out of the question. He has only his work. It is the rare exception that a man's work, no matter how attractive to him, fills his whole life, and then it is unnatural.

Why should a man of any ability spend seven or eight years of his life, and as many thousands of dollars, with no income, to prepare himself for a position commanding a salary of $1,500 a year or less? That is the question in the minds of our young men from whom we would recruit the calling, and that is the reason that it is the exceptional man who enters it with serious intent and ambition to give it his best. The goal is the professorship, a goal of indefinite and doubtful attainment. When it is reached it carries a remuneration in

*Read before Conference on Medical Education, Southern Medical Association, Thirteenth Annual Meeting, Asheville, N. C., Nov. 10-13, 1919.

Southern schools of from $2,000 to $4,000 a year, the average being about $3,000 a year.

Is a man who has the ability to attain success in whatever line he may undertake justified, to himself and to the family which he is naturally supposed to produce, in entering such a field? Is it possible that it shall be left to the recluse, one who is interested only within the confines of his quarters, and to the man of independent means? If so, it will be the former who will fill the field, as it is not common for one of independent means to select such exacting work.

One often hears the clinical profession accuse the laboratory man of being narrow, impractical, of poor judgment and poor general acumen. Has the laboratory profession already become filled with incompetents by reason of its failure to draw and support able men?

One hears on every side the call for laboratory men, from schools, hospitals, clinic groups, industrial and private practice. The smallest remuneration is offered by the school. Our teaching staffs will be further depleted by these ever-increasing calls, for why should a man who can obtain a position commanding professional respect and paying from $3,000 to $4,000 a year after he has served his apprenticeship of a year or two and become fairly proficient in laboratory work remain in a teaching position at about half the salary and with indefinite promise of advancement?

The signs of the times are clearly before us. Is the laborer worthy of his hire? Is the young man of medicine to be offered a teaching field justifying his best efforts and ambitions, in order that those of ability who would may enter, or is the better class to be barred and our profession in the future taught by the naturally incompetent?

The problem, as I said in the beginning, is an economic one. A young man entering the field of medical teaching should be offered a salary upon which he may live in comfort. Should he prove worthy he should be materially advanced in a short time and periodically advanced as his services and value increase. The goal, the professorship, should carry a salary of certainly not less than $5,000.

Not long ago I heard a business man say, "I put my money behind the man, not the business." In any business the greatest factor is the personal factor. And medical education is but a business. A well equipped enterprise will fail for the want of personal ability where an able man will succeed in spite of physical handicaps.

As a general proposition we have paid too much attention to the physical surroundings of medical education. Perhaps it would be better put that our detailed attention to the physical needs which have resulted in the expenditure of large sums of money on elaborate palaces and appointments may have blinded us to the needs of the man for whose use they are built.

Far too little attention has been paid to the teaching abilities of those who are chosen to direct the new members of the profession in their first steps. Too much stress is laid upon the amount of research work done. One of the essentials of the mental equipment of a medical teacher is the investigative turn of mind. To be a good teacher one must have the faculty of imparting this attitude to students, but to one actively engaged in teaching, if that duty is properly and conscientiously performed, there will remain precious little appropriate time for thorough and creditable research. In fact, one might engage in the most valuable investigation through possibly the span of an active life and yet be unknown for it. On the other hand, voluminous publication does not necessarily indicate valuable work or results. Often also the most efficient investigator is the poorest kind of a teacher.

THE CLINICAL COURSES

While my remarks have had special reference to the laboratory branches, some of them might be applied to the clinical departments. I need not apologize for the statement that as a general proposition our clinical courses are in nothing like the state of organization that are the laboratories. There are some schools with excellent organizations, and there are many with the poorest sort. Here must come our

next radical overhauling and reassembling. When laboratory branches have reached perfection, our graduates will still go out equipped to practice the science and art of medicine just in proportion to the efficiency of the clinics and clinical teachers.

We are in agreement that the primary function of a medical school is to educate students for the practice of general medicine. We do not expect him to be an expert in the diagnosis of tumors; we do not expect him to undertake to remove a kidney, to perform a gastro-jejunostomy, to take an x-ray picture or to remove the tonsils. We do expect him, even in the day of specialism, to be the wheel horse of the profession, the man who is going to handle the vast majority of sick people, especially of those who have the kinds of sickness seen mainly in the outdoor department, and we expect him to know when to call for the services of the limited expert. It has struck me, therefore, that we are in danger of having the cart before the horse; that our best teachers have taken unto themselves the courses which are easiest to carry and of less real value to the student; that we are leaving to inexperienced youngsters the courses wherein the patients are to be most profitably studied by the student and which require the most ability and experience to handle properly, and also that our clinical courses are top-heavy with required courses in the specialties to the detriment of more valuable general work.

The professor of a clinical branch seems to have been placed upon a pedestal to be gazed at and listened to from afar. He gives a lecture or holds a clinic, at which the class, who should be most benefited by close and intimate association, is in position to receive no material benefit except what can be gained from his words. There is a place for the lecture and the amphitheater clinic in medical teaching, but it is far overshadowed by the place occupied by the intimate work of the teacher and the student over the case.

Usually the next in rank takes care of the ward work and instruction, courses also comparatively easy to handle within the hospital with its conveniences. The part requiring the most tedious and painstaking attention, by virtue of the fact that symptoms and signs are not commonly frankly outstanding, and the part of utmost importance to the student because it takes in the main group of sicknesses of his future patients, is turned over to the lowest rank of clinical teacher, often youngsters with no practice or teaching experience and often hangers-on who are indifferent to the character of work done or incapable of doing good work.

The reason for this common arrangement is obvious. Where there is tedious work to be done, unless one loves it for the work's sake, it is human nature to pass it on to the grade below if there is such a grade. Is this a reasonable arrangement, or should not the most valuable course from the standpoint of the future physician be carried by the most efficient, capable and experienced instructor?

Has not egotism and the desire to be the center of the spectacular often led us from essential work in hand to the theatrical? To one studying faculty rolls often comes the impression that the clinical staff is top-heavy and must necessarily be burdened with hangers-on and other incompetents who are there for purposes other than the good of the student.

Some may hold that a long faculty roll is a recommendation. To me it smacks of padding, of diversity, overlapping, elaboration and disjointedness instead of team work, concentration and efficiency. Is the clinical faculty enrolled with an eye single to the benefit of the student, or is it sometimes to the advantage of the teacher?

I feel that the clinicians have important work ahead of them. From late expressions of opinion from able observers we are still turning out graduates with a word knowledge of the technic of a major operation, with a memory of the table of symptoms of an acute infectious fever, but without a proper hospital interneship to break those shackles and to develop reason and judgment, largely unable to cope with conditions which they meet on entering the practice of medicine.

Many schools are at the present entirely at a disadvantage in their relations with their clinical teachers. Too often the clinical teacher assumes the attitude of favoring the school by giving it what service he does and subordinates his teaching du-

ties to other matters to the detriment of his course. This feeling, regardless of opinion as to the justice of it, is perfectly human and natural in schools which do not pay him directly for the time which he gives. Regardless of whether or not a clinician receives an indirect remuneration for his services, it would be far better to waive the question and pay him for the time required of him for the course. Certainly he does not merit the salary of the whole-time teacher, but I believe it would be reasonable and advisable to pay him for his time. That would give the school the advantage and would result in an immediate change of attitude. It would aid immensely in the reorganization of clinical teaching. It would lead to the weeding out of the incompetents and reduction of our clinical staffs to malleable and manageable bodies.

It would also help us to reduce the specialties to a proper proportion in relation to general courses, a much needed reaction. This, of course, would not relieve the need of whole-time clinical teachers nor need it interfere with the coming of that functionary in all schools.

Unfortunately, for one reason or another, the bulk of medical schools have not followed the leaders of medical education into some of the paths which they have shown. Consequently, while I realize that possibly none of my remarks may be applicable to some of our schools, the most of us are far from our goal and the great barrier is financial.

A most pressing need in medical education is better pay for the teachers, enabling us to secure better teachers and fewer hangers-on.

DISCUSSION

Dr. Douglas VanderHoof, Richmond, Va.—I think you are all familiar with the fact that leading universities today are making definite efforts to increase their endowments in order to give their teaching staffs a proper living wage. Some of you saw in a recent issue of *The Literary Digest* some of the things done by the students at Ithica in the campaign to increase the pay of the professors at Cornell. It had its humorous side. In the parade one of the banners bore the inscription "$125,000 will support a professor and his family for a million years."

Dr. Lynch tells us what we need. He fails to tell us how we are going to get it, and any discussion of the subject of proper salaries is incomplete unless that important issue can be met. In the last fifteen years, since 1904, the number of medical schools of this country has been practically cut in half. It is a great question whether the number should not be still further reduced, and the remaining schools be associated with state universities in order that they may be properly supported by state funds. The unfortunate thing is that state institutions in the South receive such meager support from the people in the state. It is really very strange. In the middle West, for instance, state universities are supported in the most liberal fashion by the state legislatures and by the people, whereas in the South an annual appropriation of $25,000 to $50,000 is looked upon by the people of the state as a most unusual or extraordinary contribution to a medical college. This must be changed, and changed largely through propaganda of education. People as a whole do not realize what our medical schools are doing and do not appreciate at all the needs of the schools. If Dr. Lynch will tell us how to do this, how it can be applied, then we will take even a greater interest in the subject he brings up.

Dr. W. F. R. Phillips, Charleston, S. C.—Dr. Lynch has in a way told us how to get this money by showing the need of it. It has been said that the first part of education is to convince the public of the need of it. The first thing we must do is to convince the people that we need it and why. If we confine ourselves to a small room like this and do not carry it further, we have met and condoled with ourselves and deplored conditions and nothing more. That is not sufficient; we must carry this propaganda outside the room. We must publish it in the professional papers first and then in the secular papers. We must show why we need it. This is a day in which unions are in order. We might have a union. I say it rather facetiously, for I am opposed to unions. And we might say that we will cease teaching unless the public gives us its support. We can say that without having a union. We can convince the public by showing them how many men it takes to teach a medical student and that while pre-medical years can be handled by fewer men, the clinical years require a great many more men in order to teach the students actually at the bedside of the sick. While three or four teachers are sufficient in the average laboratory, it takes one teacher to every two or three students clinically instructed. Every student needs actual contact with the patient and actual supervision in the interest of both patient and student, and one man can hardly supervise more than two or three students. We must educate the public to understand this, and when we do so they will give us the needed assistance and we will have conditions in medical teaching very much improved in the matter of finances.

Dr. Chas. L. Minor, Asheville, N. C.—I am glad that Dr. Phillips can be an optimist in these days. Though I am ordinarily an optimist, on this question I fear that I am a pessimist. The world is beginning a new era, a new order of civilization, the era of the common man, when much that we have considered right and proper

is being thrown over, and much that is new and untried is being spoken of as truth. The civilization of the coming years is to be controlled by the laboring man, the carpenter, the farmer, and such, and they feel, rightly or wrongly, that in the past they have not been treated fairly by those in power, that they have been underpaid. Further, they have formed an undue idea of the importance of their services to the body politic, and they believe that the learned professions have been overpaid.

Dr. Lynch is certainly right in stating that there should be better pay for our medical teachers if we are to get the right sort of men. Just the same, under present conditions, it is not likely that we can get this extra pay. With the laboring man with his intense class consciousness in the saddle, controlling now and for always the majority of the vote, too uneducated to see things clearly, it is probable that the amount available for the payment of high-class teachers will grow less rather than more.

For some years yet we will probably get philanthropists to give money to help to improve the pay of our teachers, but the great laboring class, whom I have spoken of for convenience as farmers and carpenters, think that the man who teaches students is never worth $5,000 a year if he (the carpenter) only gets $2,000. And all his influence will be thrown against what he considers over-payment of the "high-brows."

We see the same thing today in our city elections. Our lower classes are violently opposed to paying commissioners of the city a decent salary, or any salary larger than the amount of money they themselves can earn in a year, not understanding the amount of intelligence and education which have to be put into such work. They will standardize everything down to the level of their ignorance, and since they have the vote, it is useless for us to complain.

I trust that we may finally come to a period when educators will be valued as our most important citizens and properly paid. That will only be after we have gone through a long period when the laborer will consider himself our most useful citizen and be very careful that no other class of citizens gets more than he does. Our medical schools will have to retrench and instead of getting more money, they will probably in the future get less. From present developments it seems that we must first go through a period of that miserable mediocrity which some people falsely call democracy.

Finally, however, it is to be hoped that by universal education we will raise our proletariat to a point where they can understand and apply better ideals in their lives and in the government of this country, which that greatest of all fallacies, universal manhood suffrage, has placed in their control.

Dr. Robert Wilson, Jr., Charleston, S. C.—I think that Dr. Minor is entirely too pessimistic. We are not entering a new era; we are merely passing through a period of disturbance such as civilization has passed through before. In South Carolina education has gained little by little and is still gaining. The trouble is not that we have no union. We do not want to form a union, but we do want to stand together. If all of us should go back home and in co-operation with the medical men in our several states organize a campaign of education with the will to make it a success, I believe that we should succeed.

Dr. Lynch (closing).—I agree with Dr. Wilson. I do not believe the honest laborer nowadays is as he is represented. I am not talking about the Bolshevist, but my impression of the honest wage-earner is that he is not out of sympathy with education. I believe he is the man who will support it.

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EDITORIAL DEPARTMENT

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MAJOR-GENERAL WILLIAM C. GORGAS

Cable dispatches from London announce the sad news of the passing away of General Gorgas. Nephritis is said to have been the cause of death. General Gorgas was in England en route to the West Coast of Africa, where he intended to study the epidemiology of yellow fever as a part of his work in eradicating a disease that in centuries past has claimed millions of victims, and which more than any other one cause has interfered with the development of tropical countries.

Incidentally, while in London, General Gorgas was to receive honors that had never been given to an American physician before. The news dispatches do not give the nature of the distinction that was accorded General Gorgas except to say that he was knighted by the King. King George also paid General Gorgas the distinction of calling upon him while ill in a London hospital and there making him a knight in one of the exclusive orders of Great Britain.

Few lives in all history have been more eventful than that of General Gorgas. He was born in Mobile in 1854. His father, General Josiah Gorgas, was then an officer in the United States Army, stationed at Mount Vernon Barracks, near Mobile. His mother was a daughter of Governor Gayle, of Alabama. When the Civil War came on General Gorgas' father became an officer, and Chief of Ordnance, in the Confederate Army. General Gorgas' early years were spent in Richmond, and the writer has heard him relate some interesting facts which he remembered of the siege and evacuation of the Confederate Capital.

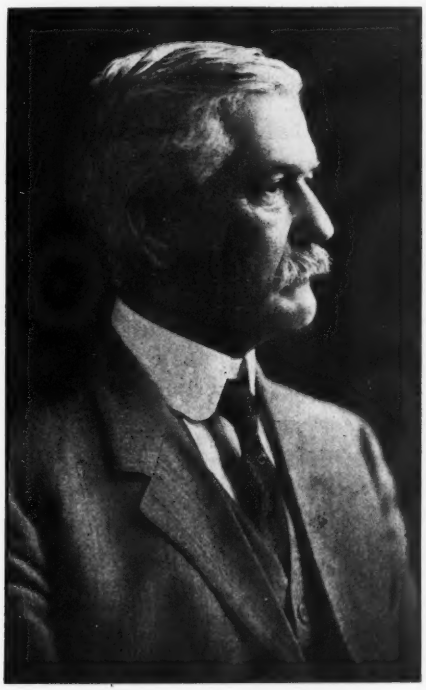
After Lee's surrender in 1865 General Gorgas' father was made President of the University of the South at Sewanee, Tennessee, where young Gorgas received his education prior to taking up the study of medicine in Bellevue Hospital Medical College, New York, from which he graduated in 1879. He immediately entered the Medical Corps of the United States Army. In 1885 General Gorgas was married to Miss Marie Cook Daughty, who, with one daughter, Mrs. Wrightson, survive him.

THE SANITATION OF CUBA AND THE CANAL ZONE

General Gorgas was inherently great, but his opportunity for fame came during the Spanish-American War, when he was placed in charge of the sanitation of Cuba. He was associated with Walter Reed, another Southerner, who won undying fame by proving that the Ardes (Stegomyia) calopus mosquito transmits the infection of yellow fever. Gorgas, then a Colonel in the United States Army, as chief sanitarian of the Island of Cuba, first applied on a large scale the principle of exterminating the mosquito in the prevention of yellow fever and malaria. The results far exceeded the hopes of the most enthusiastic supporter of the theory that the mosquito transmits disease. For the first time in more than a century yellow fever was eradicated from its stronghold

in Havana; malaria was also practically eliminated; and the death rate of this fever-stricken city was reduced by two-thirds.

The brilliant results achieved by Gorgas and his assistants in Havana made it seem possible to complete the Panama Canal, which had been begun by the French, and had been abandoned by them because of thousands of deaths from yellow fever and malaria among the employes of the ill-fated DeLessups Company. The United States purchased the property and rights of the French and also a strip of land ten miles wide, the Canal Zone, from the Republic of Panama, with the belief that American genius could complete the greatest undertaking of modern times. Gorgas was placed in charge of the sanitation of the Canal Zone and of the cities of Panama and Colon. The results there in disease prevention were as marvelous as in Havana; the Canal Zone was changed from a veritable death hole into a health resort, the death rate having been reduced to less than that of any area of the same size in the United States.



MAJOR-GENERAL WILLIAM C. GORGAS

The sanitation of the Canal Zone not only rendered possible the completion of the Panama Canal; it also proved that the white man can live and accomplish as much work in the tropics as in the colder climates, that it is tropical disease and not the heat that causes the enervation in the temperate and torrid climates. General Gorgas predicted that with the elimination of tropical disease the temperate and then the tropical zones will become the great centers of population in the world. The far-reaching effect of Gorgas' achievements will thus effect the health, lives and prosperity of millions yet unborn.

After the completion of the Panama Canal, Gorgas was sent for by the British Government to study health conditions in South Africa, to make recommendations for preventing malaria in Rhodesia and pneumonia which was epidemic among the workers in the diamond mines of the Rand. His recommendations for preventing malaria and pneumonia in South Africa will always be among the English classics on hygiene. They were followed by the British with an enormous reduction in disease and death in South Africa.

GORGAS AS SURGEON-GENERAL

While General Gorgas was in South Africa Surgeon-General Torney died, and President Taft made General Gorgas Surgeon-General of the United States Army, the position which he filled with great distinction until October, 1918, when, on account of the legal age limit of sixty-four years, he was retired.

When the United States declared war against Germany in 1917, the gigantic undertaking of protecting the health and lives of the millions of young men who went to their country's colors fell to the lot of General Gorgas. He immediately called into the Surgeon-General's office men like W. H. Welch, W. J. and Charles Mayo, Stuart McGuire, Theodore Janeway, and other leading surgeons, internists and men skilled in all lines of medical work, who aided him in building up the personnel of the Medical Department from the nucleus of 450 regular Army surgeons to more than 30,000 in less than two years.

It was fortunate for the people of the United States that a man like General Gorgas, who had the entire confidence of the public, was at the head of the Medical Department of the United States in 1917 and 1918, when we underwent not only the horrors of war, but passed through terrible epidemics of influenza and pneumonia that swept over the country like the scourges of old. It was also most fortunate that General Gorgas had the support of the medical profession of the United States during the war in a way that no other man has ever had. He was so well known to every doctor in the country, even to its remotest parts, that it was easy to get them to serve under him.

THE DREAM OF ERADICATING YELLOW FEVER FROM THE WORLD

General Gorgas' achievements as Surgeon-General of the United States Army during the World War from its beginning to October, 1918, added laurels to a life of notable achievements. Most men would have been willing to retire from active life at the age of 64; but not so with General Gorgas, who had the burning ambition to continue the fight on yellow fever in the few remaining places in which it still is endemic. He therefore agreed to head a commission for the eradication of yellow fever; and since his retirement, up to the time of his death, he spent most of his time in the tropics.

It is unfortunate that General Gorgas could not have lived to see the realization of his dream of actually driving a disease out of existence. It is hoped, however, that the International Health Board, in co-operation with the countries affected, will carry on the plans that have been evolved by the master mind of Gorgas, until the dreaded yellow jack has been forever driven from its strongholds, when ships may sail into any tropical port in the world without fear of pestilence.

DESERVED HONORS

Medical history does not record the name of a sanitarian whose achievements compare with those of Gorgas. And it is safe to predict that the future will not produce a man with like opportunities for fame in the field of preventive medicine. His name and fame will go down the ages along with Marion Sims, Walter Reed, McDowell, Long, Lister, Pasteur and other pioneers in the various fields of medical endeavor.

General Gorgas probably received more honors than any other physician of his time. He had not only received every possible honor that his American confreres could bestow, but years ago was given an honorary degree at Oxford and was made a member of various scientific societies throughout the world. Sir William Osler told the writer that in his opinion the greatest ovation ever given a medical man in England was on the occasion of General Gorgas' visit to London in 1912.

But all the honors that were bestowed upon General Gorgas did not change him from the timid, lovable gentleman that he was at all times and on all occasions. It is splendid to see a great man, whose attainments and position in life place him

with the leaders of the world, yet who himself never seems to realize that he is more than the humblest of men. Such a man was General Gorgas. It was a privilege to know him, and a distinction to call him friend. The world has not produced a man beloved more by the medical profession and the public. Even though General Gorgas died full of years, and with all the honors that could be given to one of his profession, there are millions today who mourn his passing away.

THE WAGES OF SIN

Overwork, worry, immoderate eating, and other faulty habits of living are dissipations as much as alcoholism; and, if we accept the Bible, they are as sinful. The Bible speaks of the body as "the temple of the soul" and he who defiles his body by gormandizing, or by other unhygienic habits, is surely violating biblical laws. Doctors know that "the wage of sin is death," and that men and women may destroy their bodies by gormandizing as surely as do those who ignore the biblical injunction to "look not upon the wine when it is red." Doctors also know that the transgressions of hygienic laws by overwork and worry for the sake of fame, money or social position end in disease and death as certainly as the sin of adultery, which may transmit its blighting effects to succeeding generations. Men and women, whether they believe in Christianity or not, should learn that their bodies are sacred, that the laws of physiology are unchangeable, and that he who transgresses them will find the way hard.

Most men and women sin against their bodies (violate the laws of Nature) because they have not been taught even the first principles of personal hygiene. The schools and colleges teach the classics and sciences, but neglect the teaching of physiological living. The churches in their combined attack on alcohol have taught the American people the evils of intemperance in drinking, yet many of those who preach against alcohol decrease their own efficiency and shorten their lives by intemperance in eating, and by leading sedentary and unhygienic lives. The wife upbraids husband for drinking, and rightly so, while she herself may be injuring her usefulness and may be making her husband and children unhappy because of the worry habit that wrecks homes and kills as certainly as alcohol causes crime and death.

EDUCATION THE REMEDY FOR SINS AGAINST THE BODY

There are many inconsistencies in life; and there is much for all of us to learn, particularly regarding the human body. Men and women should be taught the facts regarding the hygiene of living. They are so simple that a child can understand them, yet they are not known to most educated men, even though they tend to promote health and efficiency and in so doing increase the joys of living.

Thomas Jefferson is credited with saying: "The present generation is already lost; teach the youth of the country," and he founded a great university in his beloved state of Virginia. Jefferson was partly right in this statement, because it is much more difficult to teach men and women, who sometimes have fixed ideas about many things in life. It is easier, however, to teach adults the rules of health, if one can get their attention, than it is to teach them to children; because exuberant youth does not feel the necessity of conserving health and vitality, and while children learn easily, they do not always reason. The difficulty has been up to this time that physicians have not had the opportunity of teaching personal hygiene except to the sick, when it is often too late to be of much value. In the last decade, however, men and women have begun to

learn that efficiency depends upon health, and that both can come only from right living.

Physicians have a wonderful opportunity to teach the public generally regarding the hygienic sins that result in disease and in death; and it goes without saying that as a class they live up to their obligations. It is, therefore, to be expected that the public will receive the instruction, which it needs and desires, regarding the laws of personal hygiene which, when transgressed, result in suffering and death.

EDUCATING THE PUBLIC REGARDING THE DESPICABLE PRACTICE OF FEE SPLITTING

Dr. W. A. Evans, a native of Mississippi, formerly Health Commissioner of Chicago, and now Health Editor of the Chicago *Tribune*, is serving the public in a large way by the preparation of articles on medical matters for lay readers. Recently he has contributed a series of timely articles to the Chicago *Tribune* which gives the public some information regarding the despicable practice of fee splitting. There is no question that such articles do good, because if a physician or surgeon can not be stopped by losing the confidence and respect of his brother physicians, he can be made to become respectable when the public learns of the wiles of those nefarious traffickers of human lives known as fee-splitters. It has been suggested by the American College of Surgeons that this series of articles by Dr. Evans be reproduced in the newspapers throughout the country.

The following is extracted from the first of Dr. Evans' articles on fee splitting:

WHAT IS FEE-SPLITTING?

Wisconsin has had an anti-fee-splitting law for several years. As the old law proved unavailing, a new one has recently been placed on the statute books.

Among other states having laws against fee-splitting are Ohio and Iowa. I do not know that the legality of any of these laws has been passed upon by a supreme court. That is probably due to the fact that no great effort has been made to enforce them. At the present time we can say that in some states fee-splitting by medical men is illegal. In no state is it specifically legal.

The American College of Surgeons, the American Medical Association, and the various state and local medical societies have condemned fee-splitting by formal vote. It is evident that fee-splitting among medical men is not the custom, and that such of it as is done is condemned by medical organizations. It is practiced by only a small proportion of the operators, and they not of high standing. The proportion of family physicians who peddle their patients is even smaller still.

Should fee-splitting among doctors be illegal and condemned, while among lawyers and business men it is approved by law, custom, and public opinion? If so, why? Another question: Why is it discussed in this column?

Fee-splitting among physicians should not be allowed to become the custom. Why? Because of the abuses to which it leads.

How is it worked? The answer to this question shows some of the possibilities for abuse. A man consults a physician. The physician examines him and tells him he needs an operation. The sick man asks who is to do the operation. If the fee-splitter has an understanding with some one as to his commission, he suggests the man. The probability is that he will say to the patient, "I expect to be running into the city about that time. I will take you in." When they reach the city, they see the operator together. The patient may be told that the home doctor is to assist at the operation.

In the worst cases of this group, the home doctor arranges the amount of the fee, collects it, and pays the operator, relieving the patient of all those details. In some, the operator collects, saying nothing to the patient about any payment to the physician who came with him. The patient can be certain that the family physician does not assist at the operation. An operating room organization arranges that each assistant shall have his work cut out for him. Team work is a necessity. Each assistant must know how to anticipate the next move of the operator. If an outside physician is allowed on the operating floor he may be permitted to put on a gown and stand close by, but he must not touch any instrument. The statement that the physician is paid for assisting can not be substantiated.

If the physician has not established connection with fee-splitters and wishes to get a portion of the fee, he may tell his patient that he will find out who is the best man to operate on him. Meanwhile, he may write for bids. The physician at home generally has a suspicion as to which operators can safely be approached on the proposition of splitting a fee.

On the other side, operators in search of business sometimes send out letters in which proposals for fee-splitting are made. Within certain limitations, the fee-splitting operators know to whom, among the non-operating physicians, it is safe to send such a proposal.

When a patient asks his physician to select an operator for him, he has a right to expect that the physician will give him the name of a thoroughly capable man. More than that, he should expect the name of an operator who suits the circumstances of his case best. If his physician is a fee-splitter, what he gets is the name of the fee-splitting operator with whom the physician has been able to make satisfactory terms.

Should the patient learn the facts and ask the fee-splitting family physician to justify himself, the physician would explain that he was underpaid; that the operator was overpaid, and that he had a right to a sufficient portion of the fee to even up. His answer might satisfy a person easily satisfied. Furthermore, he would claim that the operator selected was competent. To select any other would be bad business policy. This answer appears sound, and it, no doubt, would satisfy a person easily satisfied.

But let us dig a little deeper and see if the facts disclosed by the digging help the fee-splitter. The immediate answer to the fee-splitter is this: if fee-splitting is a justifiable transaction, then let those who practice it come right out in the open. Let the physician concerned tell the patient that the fee is to be split, and the basis on which it is split.

Theoretically, this is a partial remedy, but, practically, it fails, because nobody will do it, or practically nobody. An open fee-splitter confesses his incompetence. What happens under the present method? The very competent operators do not split fees. They know they are competent and they get, and will get, the business which comes to them on a basis of merit. The operators who split fees are second and third grade operators. Therefore, a patient who is being disposed of by fee-splitters, among fee-splitters, may be certain that the best he can get is one of the best among the second or third grade men. He can be certain that he never has a chance to get the services of any high grade man, of any man good enough to get business on his merit alone.

The first coil, then, Mr. Patient, is that you get at best a second grade man, though you pay the price of first grade service.

An operation is not a light matter. Operations are to be avoided where it is good judgment to avoid them. At best they are the lesser of evils.

With the above statement in mind, what is your answer to the following questions?

If physicians are bartering patients among fee-splitters as a commercial transaction, will not unnecessary operations be the inevitable result?

If a physician diagnoses an infected appendix and sends the patient to a fee-splitter, is it not possible that the diagnosis will be confirmed, regardless of the condition found, and an operation done?

To summarize:

The results of fee-splitting are several. The patient of the fee-splitter pays more for the service than the operator in the case is accustomed to receiving. The fee collected for like service must satisfy two men, the operator and the attending physician, as well as pay the expenses of the unnecessary attendance of the physician on the trip to town.

As a class, he is operated on by a man of little training and small experience, by a second rate man, unable to get business on an open, straightforward, merit basis. He is in danger of being operated on needlessly, with danger to his life and health.

The man who is cared for by the fee-splitter does not get a fair deal. That is a part of the reason for this article. No physician can practice fee-splitting without degenerating. In time he becomes known as a fee-splitter. That hurts his standing. It makes people suspicious of him, of his opinions and advice. Accepting or paying secret commissions reacts on the moral and mental tone of the physician. Acknowledging to himself that he gets business because he pays for it, he will not work as hard to perfect himself, and to keep abreast of the times, as he otherwise would. Fee-splitting is bad for the men who practice it.

THE LOUISVILLE MEETING—IMPORTANT ANNOUNCEMENTS

For a number of years the Southern Medical Association has met during the second week in November, and all the plans for the 1920 sessions had been made for that date; but in July the Kentucky State Racing Commission did the unheard-of thing of changing the fall races from early in October to November 2 to 15, thus conflicting with the announced dates for our coming meeting.

There are some good politicians among the doctors of Kentucky, all of whom are enthusiastic in their efforts to make the coming meeting of the Southern Medical Association a great success. Those able physicians and surgeons, who because of their attainments are men of affairs and influence in their State, could change anything else in Kentucky except a racing meet, which brings to Louisville more than twenty thousand visitors twice a year. If it affected Kentucky alone, the distinguished doctors might have been able to change the date of the meet, but if this date is changed the time for the fall races from Canada to Cuba would have to be changed, because the same horses that race in Louisville also run in Toronto, Sara-

toga, Latonia, Lexington, New Orleans, Havana and other cities on the racing circuit. Those who own the horses and others who are interested in racing have hotel reservations from season to season, so that today all the hotels in Louisville are booked full for the first and second weeks in November.

The Louisville committee and the officers of the Southern Medical Association felt that it would be unfair to the two thousand or more physicians who will attend the coming meeting of the Southern Medical Association for them to go to Louisville and be uncertain about hotel accommodations. The date therefore had to be changed. The first week in November is election week, when the doctors elect the President of the United States, in addition to putting into office many Senators and Congressmen. They could not be expected to forego that prerogative even to attend the meeting of the Southern Medical Association. The last week in October was considered, but that was found to be the date for the Chicago meeting of the Mississippi Valley Medical Association, in which many of the leading men in Louisville are interested, so that week had to be given up. Then it was decided to hold the meeting November 15-18, which is just one week later than the date previously announced.

NOVEMBER 15-18

The changed time of the meeting seems best after all, and the progressive doctors of the sixteen Southern states will be there to learn from their brother practitioners of the recent advances in the science and practice of all the branches of medicine and surgery. These earnest doctors, who attend these meetings year after year for the purpose of bringing back to their work new ideas by means of which they may give the best of service to their patients, do not go for entertainment, and lack of creature comforts would not keep them from going. They will go to Louisville the third week in November for what they will get out of the meeting, but they will also enjoy the delights of Kentucky hospitality.

November 15-18, the dates for the meeting of the Southern Medical Association, will be home-coming week for the doctors who were born, or who were educated in Kentucky. The six medical colleges, which consolidated to make one great school, the Medical Department of the University of Louisville, have about ten thousand alumni, most of whom are practicing in the South. Many of these men will go back the third week in November to visit the familiar scenes of their college days, and to see the great institution which is now their alma mater.

Vanderbilt, the University of Tennessee, the University of Virginia, Tulane, Johns Hopkins, the Atlanta Medical College and other medical schools are also arranging for reunions and dinners for their alumni, so that the meeting of the Southern Medical Association will be a delightful as well as most profitable outing for the wise and favored ones who can attend.

HOTEL RESERVATIONS

It might be well to mention that it would be best for those who expect to attend the November meeting of the Southern Medical Association to make their hotel reservations early. The hotels in Louisville, as in other cities during conventions, insist upon reserving rooms only when there are two who will room together.

The meetings of the Southern Medical Association are enjoyed most when doctors take their wives with them, or at least there will be fewer explanations when a man gets back home if he has his wife with him; so that every year more and

more doctors are taking their "better halves" with them. Doctors who are fortunate enough to enjoy the blessing of matrimony, therefore, are advised to take their wives to Louisville; and those bachelors and married men who have to travel alone are urged to select a congenial doctor friend for a room mate during the Louisville meeting and to write now for hotel reservations. There is no need for any doctor to remain at home for fear that he will not be comfortable at Louisville. A city that cares for more than twenty thousand visitors during the spring and fall races will have no difficulty in taking care of the two thousand or more physicians who will attend the meeting of the Southern Medical Association, November 15-18.

On page 620 of this issue will be found a list of Louisville hotels, their location and rates, section hotel headquarters, and the Louisville plan for taking care of her guests.

THE SCIENTIFIC EXHIBITS AT THE LOUISVILLE MEETING

The meetings of the Southern Medical Association have demonstrated that within the sixteen Southern states there are just as able and as scientific men in all the various branches of medicine as can be found in the whole world. The Southern Medical Association does not claim to be in any way responsible for the scientific spirit that pervades the medical men in the territory which it represents, though every year at its annual sessions it is becoming more and more the clearing house through which the advances in medicine and surgery are made known to the medical profession; while through its monthly JOURNAL it is disseminating information regarding the progress in the science and practice of medicine that is said to be most helpful to the physicians of the South. Heretofore the section sessions have been the principal attractions at the meetings of the Southern Medical Association; but at Louisville the scientific exhibits will prove an innovation which will be most interesting and helpful in demonstrating the work that is being done in the various medical centers of the South.

The Louisville Armory has quite the most attractive and the largest exhibit hall that has ever been tendered the Southern Medical Association. There is enough space in it for a scientific exhibit that will be worth the trip to Louisville to see by any physician from any part of the South; and those in charge hope to get together the material that will be of interest to every medical man who attends the meeting. Already those who are engaged in research work in various colleges and hospitals in the South are manifesting an interest in the scientific exhibits that augurs well for the success of that feature of the meeting.

One of the objects of the Southern Medical Association is to foster the spirit of scientific and research work among its members. Some years ago it offered a medal for original and especially meritorious research work. This medal has been awarded to several distinguished physicians and surgeons in the South. It is an honor that is prized by those who have received it. In order to further show its interest in the progress of medicine, the Council of the Southern Medical Association now proposes to offer three additional medals at the Louisville meeting—one for the best exhibit by a state, county or municipal board of health; one for the best exhibit from a medical school; and one for the best exhibit by an individual physician. It is understood that these exhibits must come from within the territory of the Southern Medical Association. Any physician who would like to have a scientific exhibit at Louisville will please com-

municate with the Association office.

There will be ample space for all those who desire to demonstrate to the physicians from sixteen states the work they have been doing; and the scientific exhibits will surely be one of the most attractive features of the Louisville meeting. The Council, at its session on Tuesday morning, will select the committee to judge these exhibits and the awards will be made at the last general session Thursday.

HOTELS FOR THE LOUISVILLE MEETING

The Louisville Committee on Hotels announce the following hotels and hotel headquarters for the fourteenth annual meeting of the Southern Medical Association November 15-18. They suggest that those contemplating attending make hotel reservations early. And they emphasize the fact that the Louisville hotels, as in other cities during conventions, will make reservations only with the understanding there are to be at least two in a room.

SEELBACH HOTEL, Fourth and Walnut Sts.

General hotel headquarters; hotel headquarters for Section on Medicine, Section on Pediatrics, Southern Gastro-Enterological Association, and Conference on Medical Education.

Single room, $2.50-$3.00.
Double room, $4.00-$4.50.
Single room with bath, $3.00-$4.50-$5.00-$6.00-$7.00.
Double room with bath, $5.00-$6.50-$7.00-$8.00-$9.00.

HOTEL HENRY WATTERSON, Walnut St., between Fourth and Fifth.

Hotel headquarters for Section on Eye, Ear, Nose and Throat, Section on Urology, Section on Orthopedic Surgery, and Section on Roentgenology.

Single room, $1.75-$2.50.
Double room, $3.00-$4.00.
Single room with bath, $2.50-$6.50.
Double room with bath, $3.50-$7.00.

TYLER HOTEL, Third and Jefferson Streets.

Hotel headquarters for Section on Surgery and Southern States Association of Railway Surgeons.

Single room with bath, $2.50 up.
Double room with bath, $4.00-$6.00.

LOUISVILLE-OLD INN HOTEL, Sixth and Main Sts.

Hotel headquarters for Section on Public Health and National Malaria Committee (Conference on Malaria).

Single room, $1.50-$3.50.
Double room, $2.50-$4.50.
Single room with bath, $2.00-$6.00.
Double room with bath, $3.50 up.

HOTEL KENTON, Walnut St., between Fourth and Fifth.

Single room, $1.50-$4.00.
Double room, $2.50-$6.00.
Single room with bath, $2.00-$6.00.
Double room with bath, $3.50 up.

HERMITAGE HOTEL, 543-545 South Fifth St.

Single room, $1.50 up.
Double room, $2.00 up.
Single room with bath, $2.00 up.
Double room with bath, $3.00 up.

WILLARD HOTEL, Center and Jefferson Sts.

Without bath, $1.50.
With bath, $2.00-$2.50.

VICTORIA HOTEL, Tenth and Broadway.

Single room, $1.50.
Double room, $2.50-$4.00.
Single room with bath, $2.50.
Double room with bath, $4.00.

Working in connection with the Hotel Committee of the Jefferson County (Louisville) Society is the Louisville Convention and Publicity League, and they promise to see to it that every guest coming to Louisville for this meeting has comfortable quarters. When a request for reservation comes to any of these hotels and the hotel happens to be booked full, they immediately turn the letter or telegram over to the Convention and Publicity League, and the League then gets in touch with another hotel to make the reservation; and when all the hotels are full, if such should be the case, then the League arranges accommodations at a good rooming house or in a private home.

The housing work of the Convention and Publicity League is well organized. It has a complete record of every available room in the city, and is making up a special list for the Southern Medical Association, because many of the better homes having a spare room that is not available for the average convention, are being thrown open for our meeting if necessary. The Convention League will have its corps of workers at the Southern Medical Association General Headquarters at the Armory, Walnut Street, between Sixth and Seventh Streets, all day and until midnight each night, and it promises to find promptly a comfortable room for every doctor that may come even if he does not have a reservation and the hotels are full.

Remember that Louisville takes care of more than twenty thousand visitors during the spring and fall races, so there is no need to fear not having a comfortable place to stay. Whether you have a reservation or not, come on, for the Committee guarantees you comfortable quarters.

Southern Medical News

ALABAMA

Surgeon General Cumming, U. S. Public Health Service, after an inspection of the quarantine facilities at the Port of Mobile will recommend the erection of a new quarantine station in the outer harbor of Mobile Bay.

Dr. G. H. Smith and Miss Annie Merle Farrar, both of Blocton, were married June 16.

Dr. W. C. Gewin, Birmingham, was elected President of the Chattahoochee Valley Medical and Surgical Association at its twentieth annual meeting at Warm Springs, Ga., July 13-14.

ARKANSAS

Dr. E. H. Martin, Hot Springs, announces the formation of the Martin Clinic as follows: Dr. E. H. Martin, chief of clinic; Dr. E. A. Purdum, medicine; Dr. W. G. Klugh, neurology; Dr. G. C. Coffey, urology;

Dr. W. F. Porter, gastrology; Dr. W. C. Minnich, surgery; Dr. M. T. Edgerton, ophthalmology; W. J. Ford, roentgenology; and L. M. Runskeqitz, clinical pathology.

Dr. William E. McLean has been made Health Officer of Little Rock, vice Dr. Robert C. Foster, resigned. Dr. Foster has been appointed Passed Assistant Surgeon, U. S. Public Health Service, and stationed at Houston, Texas.

Dr. Octavius L. Williamson, Marianna, has been appointed a member of the State Board of Health, vice Dr. Charles M. Lutterloh, Jonesboro, deceased.

Deaths

Dr. Elijah H. Hesterly, Cerro Gordo, aged 47, was drowned June 19 when fording Little River.

Dr. Sanford Reamey, Hot Springs, aged 92, died June 19.

Dr. Frank M. Owens, Remmel, aged 45, died March 25 from cerebral hemorrhage at Amagon.

Dr. James F. Bell, Lonoke, aged 65, died May 21.

Dr. Thomas H. Bowles, Dumas, aged 65, died May 22.

DISTRICT OF COLUMBIA

The annual meeting of the Southern Railway Surgeons Association was held in Washington early in June. Dr. William A. Applegate was elected President and Mobile chosen for the 1921 meeting.

FLORIDA

Deaths

Dr. W. R. O. Veal, Martel, aged 80, died March 10 from acute cystitis.

GEORGIA

The Medical Association of Georgia held its eighty-ninth annual session in Macon early in May. The following are the new officers: President, Dr. Edward T. Coleman, Graymont; Vice-Presidents, Dr. Theodore E. Oertel, Augusta, and Dr. Fred L. Webb, Macon; Secretary-Treasurer, Dr. Allen H. Bunce, Atlanta.

The Chattahoochee Valley Medical and Surgical Association held its twentieth annual meeting at Warm Springs, Ga., July 13-14.

Brooks County, Telfair County and Walker County have adopted the Ellis Health Law.

Dr. Landrum J. Page, Dublin, has been elected Commissioner of Health of Hart County (Hartwell).

Dr. R. L. DeSaussure, Rome, Commissioner of Health of Floyd County, has resigned to accept a similar position in Glynn County (Brunswick).

Dr. W. H. Bryan, Pavo, has been elected Commissioner of Health of Bartow County (Cartersville).

Dr. R. W. Todd, Brunswick, Commissioner of Health of Glynn County, has resigned to accept a similar position in Cobb County (Marietta).

Dr. R. A. Herring, Milledgeville, Commissioner of Health of Baldwin County, has resigned to accept the position of Health Officer, Wilmingham, N. C.

Dr. H. F. Pope, LaFayette, has resigned as Commissioner of Health of Walker County, and Dr. J. A. Johnson, Millen, has been elected to fill the vacancy.

Dr. S. P. Kenyon, Dawson, and Miss Lucile Hooper, Atlanta, were married June 16.

Dr. T. C. Johnson and Miss Alice Anderson, Atlanta, were married June 22.

Deaths

Dr. James M. Moore, Marietta, aged 72, died June 23.

Dr. Marion T. Davis, Atlanta, aged 51, died June 26.

Dr. Guy L. Bush, Atlanta, aged 36, died June 7 .

Dr. William B. Conway, College Park, aged 71, died July 6.

Dr. A. L. R. Avant, Savannah, aged 63, died June 7 from uremia.

Dr. Charles P. Holmes, Fort Gaines, aged 59, died May 31 from acute gastritis.

KENTUCKY

In a report to the Jefferson County Medical Society, by a special committee of which Dr. Virgil E. Simpson is chairman, it is shown that Louisville, while amply provided with beds for the sick poor, is very inadequately provided with beds for pay patients. Plans are under way for the erection of an interdenominational hospital to take care of this situation

Dr. J. C. Sullivan, Mayfield, First Assistant Physician, and Dr. T. B. House, Second Assistant at the Western Kentucky Hospital for the Insane, have resigned.

Dr. F. A. Stine, Newport, has been appointed to the State Board of Health to fill the unexpired term of Dr. I. A. Shirley, Winchester, deceased.

Dr. Isaac H. Brown, Winchester, has been appointed surgeon for the L. & N. to fill the vacancy caused by the death of Dr. I. A. Shirley.

At the annual meeting of the Henry County Medical Society, held late in May, the following officers were elected: President, Dr. W. W. Leslie; Vice-President, Dr. W. F. Asbury; Secretary-Treasurer, Dr. W. B. Oldham.

At the annual meeting of the Marshall County Medical Society the following officers were elected: President, Dr. W. T. Little; Vice-President, Dr. H. I. Hughes; Secretary-Treasurer, Dr. E. D. Covington.

At the annual meeting of the Magoffin County Medical Society the following officers were elected: President, Dr. D. R. Skaggs; Vice-President, Dr. W. C. Connelley; Secretary-Treasurer, Dr. M. M. Price.

At a called meeting held in Falmouth the Pendleton County Medical Society was reorganized and the following officers elected: President, Dr. T. C. Nichols; Vice-President, Dr. O. W. Brown; Secretary, Dr. W. A. McKenney.

Dr. C. A. Wright has moved from Cayce to Fulton.

Dr. Oliver H. Kelsall and Miss Dorothy May Dietzmann, both of Louisville, were married June 22.

Deaths

Dr. Abraham J. Keightley, Louisville, aged 73, died June 7.

Dr. Julius B. Thomas, Smith's Grove, aged 79, died May 13 from uremia.

Dr. Jefferson D. Taylor, Louisville, aged 58, died July 3 from pernicious anemia.

Dr. William L. Nuttall, New Castle, aged 75, died the latter part of June from wounds inflicted by his insane brother-in-law.

Dr. Robert J. Thompson, Versailles, aged 73, died June 22.

LOUISIANA

Dr. J. George Dempsey, New Orleans, in charge of the Tuberculosis Bureau of the City Board of Health, has resigned to become Statistician of the State Board of Health.

Dr. Clarence Pierson, Superintendent of the East Louisiana Hospital for the Insane at Jackson for the past fifteen years, has resigned.

Dr. J. M. Thuringer has resigned his position as Assistant Professor of Anatomy at Tulane.

Dr. William Sheppegrell, New Orleans, was recently elected President of the Louisiana Federation of Catholic Societies.

Dr. John D. Frazar, DeRidder, has qualified as Sheriff of Beauregard Parish.

Dr. Jacob W. Newman, New Orleans, is the new President of the Louisiana Commission for the Blind.

Dr. James L. Locascio and Miss Olga Marie Elliott, both of New Orleans, were married June 23.

Deaths

Dr. Philip Asher, New Orleans, aged 53, died July 5 at Touro Infirmary after a long illness.

Dr. Charles McVea, Baton Rouge, aged 51, died July 5 from chronic interstitial nephritis.

Dr. Henry S. Bennett, Jonesville, aged 40, died June 18.

Dr. Eugene L. Henry, Lecompte, aged 46, died July 7.

Dr. John H. Ellis, New Orleans, aged 54, died June 2 from uremia.

MARYLAND

Dr. H. R. Carter, Assistant Surgeon General, U. S. Public Health Service, superintendent Marine Hospital, Baltimore, sailed for Pieta, Peru, on June 19 to engage in sanitary work for the Peruvian Government with special reference to yellow fever and bubonic plague.

Dr. Carl M. VanPoole, Mount Airy, has been named local surgeon for the Baltimore and Ohio Railroad.

Dr. Dwight H. Mohr, Baltimore, has been named Chief Police Surgeon, succeeding Dr. T. H. Athey.

Dr. Herman Gailey, Baltimore, and Miss Mary Elizabeth McConkey, York, Pa., were married June 17.

Deaths

Dr. Daniel E. Stone, Jr., Emmittsburg, aged 44, died June 13 in the Frederick City Hospital following an operation for appendicitis.

Dr. Robert J. Henry, Glyndon, aged 74, died June 7 from paralysis.

MISSISSIPPI

The physicians and dentists of Crystal Springs have purchased the Chautauqua grounds near that city for a consideration of $12,000 and will make it a summer play ground for themselves and families.

Deaths

Dr. William P. Patterson, Beauregard, aged 82, died May 1 from senile debility.

Dr. James O. Wood, Rio, aged 72, died April 4 from disease of the kidney.

MISSOURI

Dr. George M. Boteler, St. Joseph, has been appointed City Health Officer, vice Dr. H. DeLamater, resigned, to become Health Officer of Norfolk County, Virginia.

Dr. Frank Ignatius Stuart, Independence, and Miss Minnie Ruth McLaughlin, Monticello, Iowa, were married June 29.

Dr. William L. Gist, Kansas City, has been appointed superintendent of the Kansas City General Hospital, vice Dr. A. W. Thompson, resigned.

Dr. Roy R. Haley and Miss Mary Katherine Erwin, both of Brookfield, were married June 28.

Dr. James W. Bruton, Ozark, has been appointed State Deputy Health Commissioner.

Dr. G. Canby Robinson, St. Louis, President of the Missouri Association for Occupational Therapy, has resigned and Dr. Malvern B. Clopton, St. Louis, elected as his successor.

Dr. Porter E. Williams, St. Joseph, has been appointed Superintendent of State Hospital No. 2.

Dr. William A. Clark has been appointed Chief of Staff, and Dr. Lawrence D. Enloe, Secretary of St. Mary's Hospital, Jefferson City.

Deaths

Dr. Otto E. Forster, St. Louis, aged 61, died May 17 from heart disease.

Dr. Fred B. Abbott, St. Louis, aged 30, died June 20 at the U. S. Army Hospital at Oteen, near Asheville, N. C., from lung trouble contracted from being gassed while in active service in France.

Dr. Albert H. Wolff, Joplin, aged 45, died at Los Angeles, Cal., the latter part of June.

Dr. Adolph Alt, St. Louis, aged 69, died June 28 from heart disease.

Dr. George T. Northcutt, Seligman, aged 54, died May 18 from cerebral hemorrhage.

Dr. Oscar H. Fischer, St. Louis, aged 44, died June 14 from celebral hemorrhage.

Dr. Joseph Burton Connell, Kansas City, aged 64, died in a sanatorium in Jacksonville, Ill., June 18.

Dr. William H. Price, Carterville, aged 79, died June 14.

Dr. Grant Newton, Dexter, aged 52, died June 14 from dropsy.

Dr. James C. Stewart, Kansas City, aged 69, died June 21 from the effects of roentgen-ray burns.

Dr. George J. Pickenpaugh, Unionville, aged 64, died June 9.

Dr. Joseph P. Fitzpatrick, St. Louis, aged 52, died July 4.

Dr. Harry LaRue, Dexter, aged 52, died May 27 from cerebral hemorrhage.

NORTH CAROLINA

Dr. Charles E. Lowe, Wilmington, has resigned his position as Health Officer of New Hanover County. He will be succeeded by Dr. R. A. Herring, of Milledgeville, Ga.

Dr. Wiley W. Johnston, Winston-Salem, and Miss Bess Swearingham, Charlotte, were married June 10.

Out of the profits of Grove Park Inn, Asheville, the finest resort hotel in the world, the owner recently announced he will construct and maintain in Asheville a modern hospital for the treatment of crippled children of America. It is to be located on Sunset Mountain, near the Inn. Dr. W. P. Herbert, Asheville, will be Chief of the Medical Staff, and will be assisted by a staff of specialists, all giving their services gratis.

The State Board of Health reports for the month of June show the smallest number of typhoid fever cases since accurate statistics have been kept. For the whole month 152 cases were reported, against 432 for June of last year, a reduction this year of 280 cases.

Fire originating near the operating room of the James Walker Memorial Hospital, Wilmington, greatly damaged the building on June 22 and for a time threatened to destroy the whole structure. All patients were removed uninjured. Total damage approximately $25,000.

Deaths

Dr. Paul O. Owsley, Asheville, aged 46, died July 8.

Dr. Ivey G. Riddick, Raleigh, died recently from carcinoma of the throat.

OKLAHOMA

Dr. Fred H. Clark, El Reno, has move to Oklahoma City.

Dr. Charles T. C. Buckner, Capt. M. C., U. S. Army, Fort Sill, Okla., and Miss Mildred Alston Lee, Montgomery, Ala., were married June 17.

Dr. W. F. Griffin, Greenfield, has moved to Watonga.

Dr. J. E. Hollis, Snyder, has moved to Altus.

Dr. Daniel S. Lee, Guymon, and Miss Lillian Erline Willoughby, Liberal, Kan., were married May 11.

Dr. Lee W. Cannon, Enid, has announced he will be a candidate for the State Senate on the Democratic ticket.

Dr. Dewitt Stone, Sayre, and Mrs. Lene Castleberry, Elk City, were married June 5.

Dr. B. J. Plunkett, Duncan, was knocked down by an automobile and seriously injured recently.

Dr. R. O. Early, Ardmore, moved to Oklahoma City July 1.

Dr. A. G. Hunt, Howe, and Miss Bessie Taylor, Cameron, were married May 16.

Dr. E. E. Waggoner, Pawnee, in making a run for second base in the Fats vs. Leans baseball game sustained a fracture of bones of the leg.

Dr. C. Cantrell, Healdton, was injured seriously when his car turned over. In the car with him were three members of his family, who were also injured.

Muskogee will be one of the clinical centers for disabled beneficiaries of the War Insurance Act, according to an announcement of the U. S. Public Health Service.

Dr. C. L. Reeder, Tulsa, Director of the Venereal Diseases Control Clinic, has taken steps looking to the establishment of an isolation hospital for venereal cases.

Dr. Elizabeth Elva Lehmer, Oklahoma City, enjoys the distinction of being the first woman ever granted the degree of Doctor of Medicine in Oklahoma. She graduated in the class of 1920 and will serve as interne at St. Anthony Hospital.

Dr. Joseph T. Antony, Ardmore, and Miss Evelyn Whitehead, Springfield, Mo., were married in April, but did not announce the fact until Miss Whitehead completed her nurse's course in the Southwestern Hospital, Ardmore.

Dr. A. R. Lewis, State Commissioner of Health, in his annual report, recommended an appropriation by the State to pay for operations on children whose parents were unable to bear the expense. Dr. Lewis has had a survey made of the children in the eleemosynary institutions to ascertain if minor operations would not improve their condition and makes his recommendations upon the finding of this survey. He argues that by preventive treatment now the State will be relieved eventually of the care of these people.

Deaths

Dr. Evans Scott, Holdenville, aged 85, died recently.

Dr. C. D. Ferguson, Oklahoma City, died at Corpus Christi, Texas, June 11 following an illness of several years.

SOUTH CAROLINA

With the completion of the large addition to the new City Hospital at Greenville, Dr. Joseph Arsonson has been placed in charge as superintendent. .

The Eighth District Medical Association met in Allendale early in July. New officers elected were: President, Dr. J. S. Palmer, Allendale; Vice-President, Dr. J. R. McCormack, Olar; Secretary-Treasurer, Dr. G. W. I. Loadholt, Fairfax.

Dr. C. E. Smith after three years in Columbia as City Health Commissioner has returned to Greenville to resume his work as Health Commissioner for Greenville, having been elected to that position several weeks previous. Dr. Smith succeeds Dr. W. W. Richards, resigned.

The State Sinking Fund Commission has sold the old South Carolina Medical College Building, Charleston, for $12,000.

(Continued on page 36)

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(Continued from page 622)

The Columbia Medical Society held a Clinic Day in Columbia June 8. There were more than 150 surgeons from over the State in attendance.

Dr. Elizabeth S. Van Duyne, who has been Resident Physician and Professor of Physiology and Hygiene at Converse College, Spartanburg, will next year hold a similar position with Goucher College, Baltimore.

The Medical College of the State of South Carolina held its annual commencement, Charleston, June 3, when degrees were conferred on a class of fourteen. The following faculty changes were announced: Dr. J. P. Richardson, instructor in clinical pathology; Dr. J. J. LaRoche, instructor in medicine; Dr. M. W. Beach, instructor in pediatrics; Dr. H. S. Mustard, instructor in medicine; Dr. H. P. Jenkins, Jr., assistant in obstetrics, and Dr. William Rhett, assistant in pediatrics. Dr. Harry E. Levit won the Blease medal and the college cup for honor graduate in medicine.

Deaths

Dr. Edward B. Smith, Marion, aged 81, died May 25 at Centenary from senile asthenia.

Dr. T. E. Rhame, Clinton, aged 46, died July 11 from injuries sustained from a fall from his motor driven bicycle.

Dr. John Lyon, Greenwood, aged 46, died June 21.

TENNESSEE

The Pulaski Academy of Medicine held a reorganization meeting at Pulaski on June 25 and elected the following officers: President, Dr. R. E. Warren; Vice-President, Dr. A. J. Lancaster; Secretary-Treasurer, Dr. G. C. Grimes.

Actual work on the first unit of the new Vanderbilt University Medical School will be under way before September 1 and rushed to completion, according to an announcement by Dr. G. Canby Robinson, Dean. The first unit comprises Galloway Hospital, the laboratory for pathology and nurses' home, and it is thought they will be completed by September, 1921. The hospital will contain 286 beds. The construction of the re-

(Continued on page 38)

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(Continued from page 36)

mainder of the plant will go on as rapidly as possible. It is said the hospital, dispensary and other buildings will have no superior anywhere. The plant will require an expenditure of $4,000,000. Reorganization of the medical school will not take place until 1921.

An addition to the Protestant Hospital, Nashville, to cost $360,000 is proposed, and funds are being raised for its construction.

The State Board of Medical Examiners met in annual esssion at the Maxwell House, Nashville, July 5.

Dr. Thomas F. Staley, Bristol, has opened a fourteen-room eye, ear, nose and throat infirmary.

Dr. E. B. Wise has been appointed Director City Health Department of Chattanooga, vice Dr. Stanton H. Barrett, resigned.

The annual meeting of the Middle Tennessee Medical Association was held in Centerville recently. Dr. John H. King, Nashville, was elected President.

A campaign for $15,000 is soon to be launched in Bristol to build a hospital for the negroes.

Dr. Milton Wiggins, Paris, who has been in the Army, has returned to resume his practice.

Deaths

Dr. William L. Walker, Centerville, aged 74, died in Nashville June 23, a few days after an operation for gallstones.

Dr. Sinclair D. Gervais, Niles, aged 80, died March 3 from pneumonia. Dr. Gervais was an Assistant Surgeon in the Confederate Army.

Dr. Eugene A. Neely, Memphis, aged 57, died June 30 at Lonoke, Ark.

Dr. Karl A. G. Sundstrom, Chattanooga, aged 35, who was undergoing reconstruction at U. S. General Hospital, Oteen, N. C., died in that hospital June 1.

Dr. Xavier B. Haynie, Gallatin, aged 72, died June 11.

TEXAS

The Dallas County Medical Society gave a banquet recently to Dr. I. C. Chase, Fort Worth, President of

(Continued on page 40)

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(Continued from page 38)

the Texas State Medical Association; Dr. Holman Taylor, Secretary, and Dr. I. S. Kahn, San Antonio. Dr. C. M. Rosser acted as toastmaster. Short addresses were made by Dr. J. O. McReynolds, Dr. E. H. Cary, Dr. J. J. Simmons, Dr. R. L. VanZandt, Fort Worth, and Dr. Gilcreest, Gainsville. There were 120 physicians in attendance.

Dr. Gottlieb Werley and Dr. Bessie Lucretia Sweet, both of El Paso, were married July 3.

A new Physicians and Surgeons' Hospital for Fort Worth, to cost $150,000, is being promoted. Tentative plans have been made.

The capital stock of the Paris Sanitarium, Paris, was increased from $75,000 to $200,000 at a recent annual meeting. The increased capital is for the purpose of making an extension to the building and other improvements.

Dr. J. D. Wright, formerly Federal physician for Dallas, has been appointed Federal physician for Fort Worth to succeed Dr. Trimble.

A tuberculosis hospital for the exclusive use of the negroes is being urged at Corsicana.

The Southwest Texas State Normal College, San Marcos, is to have its new hospital completed by the opening of the college this fall.

The Commercial Hotel property, Deport, has been purchased by local interests and will be converted into a sanitarium.

Dr. Charles W. Goddard, Austin, State Health Officer, has been elected Physician in Chief to the University of Texas.

Dr. Dru McMichin is the new Health Officer for Beaumont.

Dr. Charles S. Gates, Austin, is to be physician for men at the University of Texas.

The Bexar County Medical Library Association, San Antonio, with a capital stock of $10,000, has been incorporated by Drs. Frank Paschal, T. L. Moody and William A. King.

Deaths

Dr. O. S. Carlow, Alvarado, aged 51, died recently.

Dr. Ellsworth S. Blythe, Allen, aged 61, died June 14.

(Continued on page 42)

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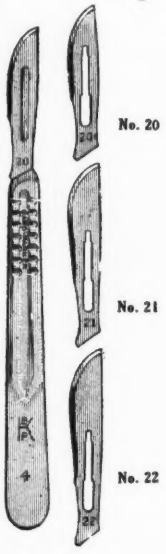

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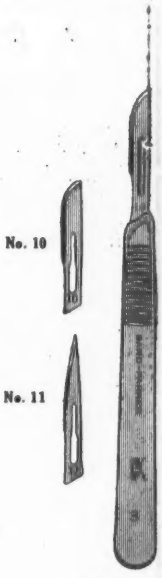

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Intent they wait through all the solemn scene,
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LEESBURG, VA.

(Continued from page 40)

Dr. William E. Baker, Duncanville, aged 62, died May 29.

Dr. Edward T. Lawler, Amarillo, aged 42, died June 29.

Dr. Clayborn R. Carver, Eldorado, aged 63, died June 8 from angina pectoris.

VIRGINIA

Dr. E. L. Flanagan, Health Officer for Fairfax County, has resigned to re-enter private practice at Richmond.

Dr. Howard Urbach, Richmond, has been elected Physician of the Maccabees Lodge.

The colored people of Richmond have launched a movement to erect a $150,000 hospital to be managed, equipped and operated by colored doctors, nurses, etc. It is proposed that this be a memorial to the colored men who served in the World War.

Dr. D. L. Elder, Mayor-elect of Hopewell, has resigned as Coroner, and Dr. J. N. Elder has been appointed to fill the vacancy.

Dr. Wm. L. Gannaway, Abington, has moved to Kingsport, Tenn.

Dr. W. J. Sturgis, Frankton, has contracted for the erection of the Northampton and Accomac Hospital to be erected at Nassawadox, on the Eastern Shore of Virginia. It is to be four stories high and to cost $75,000 without furniture and fixtures.

Dr. J. Grady Booe, Richmond, interne at Stuart Circle Hospital, resigned July 1 to become Associate Physician at Galen Hospital, Bridgeport, Conn.

Dr. L. E. Stubbs, Gloucester, has moved to Newport News.

Dr. Simon H. Rosenthal, Lynchburg, and Miss Bettye Greenberg, Danville, were married June 6.

Dr. Edgar W. Young, McKenney, has moved to Petersburg.

Dr. E. R. Miller, Harrisonburg, has been elected President of the Virginia State Sunday School Association.

St. Philip's Hospital, for colored people, owned and operated by the Medical College of Virginia, will open

(Continued on page 44)

PATHOLOGICAL DEPARTMENT

OF THE

SOUTH HIGHLANDS INFIRMARY

AND

ST. VINCENT'S HOSPITAL

BIRMINGHAM, ALA.

Pathological, Bacteriological, Serological and Chemical Examinations

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Dear Sir:
I have been retained by Mr.....to bring proceedings for malpractice for the death of their baby, who died on May 10th, 1919, as a result of an operation performed by you.
Before starting this proceeding, if you desire to make any adjustment of the matter of settlement of it, kindly call and see me. I remain,
Yours very truly,
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Bacteria responsible for infection identified

Autogenous Vaccines prepared

Blood chemical analyses

All routine laboratory work done

Containers for mailing specimens furnished on request

Dr. GEORGE B. ADAMS

Clinical Laboratory

707 Maison Blanche Annex

New Orleans

(Continued from page 42)

in September. Colored women will be given nursing training in the hospital.

Dr. J. A. Riffe, Clifton Forge, has moved to Covington.

Dr. Bernard Hewitt Kyle and Miss Putnam Watkins, both of Lynchburg, were married June 16.

Dr. Richard W. Vaughan and Miss Marguerite Stoltz, both of Richmond, were married June 19.

Dr. William S. Wiley and Miss Susan Elizabeth Brown, both of Bristol, were married June 24.

Dr. Charles E. Llewellyn, Richmond, and Miss Pearl Ann Shield, Hampton, were married June 12.

Dr. Zack P. Mitchell, Colerain, and Miss Ella Whitlock Taliaferro, Richmond, were married June 9.

Dr. Henry W. Decker, Lahore, and Miss Florence Fraser Boston, Warrenton, were married June 15. They will leave in September for Shanghai, China, where Dr. Decker goes as a medical missionary.

A campaign is on in Bristol to raise $15,000 for a modern hospital for colored people.

The first annual report of Dr. E. C. Levy, Director of Public Welfare for Richmond, shows health and sanitary conditions much improved.

The Jewish people of Norfolk, Portsmouth, Berkley and Newport News have organized a campaign for $200,000 for a Jewish hospital to be located in Norfolk.

Deaths

Dr. George E. Meredith, Lanesville, aged 56, died June 9 following a stroke of paralysis.

(Continued on page 46)

CLASSIFIED ADVERTISEMENTS

APPLICATIONS are desired from physicians for position as doctor aboard steamship. Salary and fees and agreeable position. Users of alcohol and narcotics need not apply. Give age, college and date of graduation. Any state license sufficient. Address N. R. O., care JOURNAL.

FOR SALE—One $250 Max Wocher hospital sterilizer; twelve steel bedside tables, white enameled; one large and one small instrument table. All used about one month and as good as new. Will sell at 25 % discount f. o. b. Lakeland, Fla. Wire or write Piedmont Hospital, Lakeland, Fla.

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LOCATION WANTED—In city of 5,000 or more people, with all modern improvements, and where the people are friendly and agreeable and where competition is light. Am willing to pay cash, a reasonable amount for a practice, if it will stand investigation by competent physician, 39 years old, in perfect health, married, who has seen service in A. E. F. and had charge of a training hospital in South America. Can furnish reference as to qualifications. Can come on short notice. Address L. E. H., care JOURNAL.

INTERNES WANTED—St. Joseph's Hospital (a three-hundred bed general hospital) needs two more internes, and would be glad to consider applications. Recent graduates preferred; state school graduated from and year of graduation. Compensation, board and lodging, and instruction. Term of service, one year. Apply to Dr. O. S. McCown, Bank of Commerce & Trust Building, Memphis, Tenn., President of Staff.

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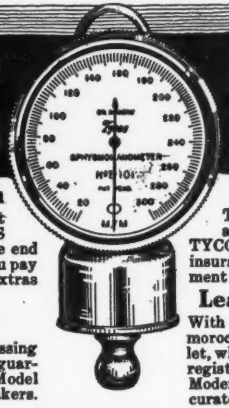

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Cash Price Everywhere $25 But we will send it to you upon receipt of only $2.50 and allow you ten days free trial. If then you wish to keep it, simply pay the balance, $22.50, in nine small monthly payments of $2.50, and the instrument is yours. You cannot buy it for less anywhere else. You cannot buy it on such easy terms except by the Aloe Easy Rental Purchase Plan.

Ten Days Free Trial Just enclose first month's rent—$2.50 and we will ship the TYCOS at once. Try it thoroughly for ten days. Give it every test you can. If you are willing to part with it, send it back at our expense and get your money. If pleased, then pay only $2.50 a month for 9 months. SEND FOR YOUR TYCOS TODAY. Do it NOW. Let it PROVE it's usefulness to you. It is so easy to own that you'll never miss the money.

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(Continued from page 44)

Dr. Benj. I. Berman, Norfolk, aged 46, died June 16 as a result of injuries sustained when he was struck by a motorcycle.

Dr. G. A .Boone, Troutville, aged 70, died July 9.

WEST VIRGINIA

Dr. L. V. Guthrie, Superintendent Huntington State Hospital, was made Chairman, Mrs. Woodson T. Willis, Charleston, Vice-Chairman, and Mr. L. H. Putnam, State Board of Children's Guardians, Executive Secretary, of the State Committee of Mental Hygiene at a conference held in Charleston June 17. Dr. V. V. Anderson, Medical Director of the National Committee for Mental Hygiene, was present at the conference. A survey of the feeble-minded in West Virginia is to be made.

Dr. Marshall Moore, Ingram Branch, and Miss Margaret Owens, Ceredo, were married in June.

Dr. I. V. Peters, Mayberry, and Miss Lillian Davis, Huntington, were married June 16.

Dr. John M. Emmett, Huntington, and Miss Annie Cleveland Cone, Richmond, Va., were married June 16.

Deaths

Dr. Preston Boggs, Franklin, aged 52, died June 19.

Dr. William A. Barnes, Martinsburg, died in May.

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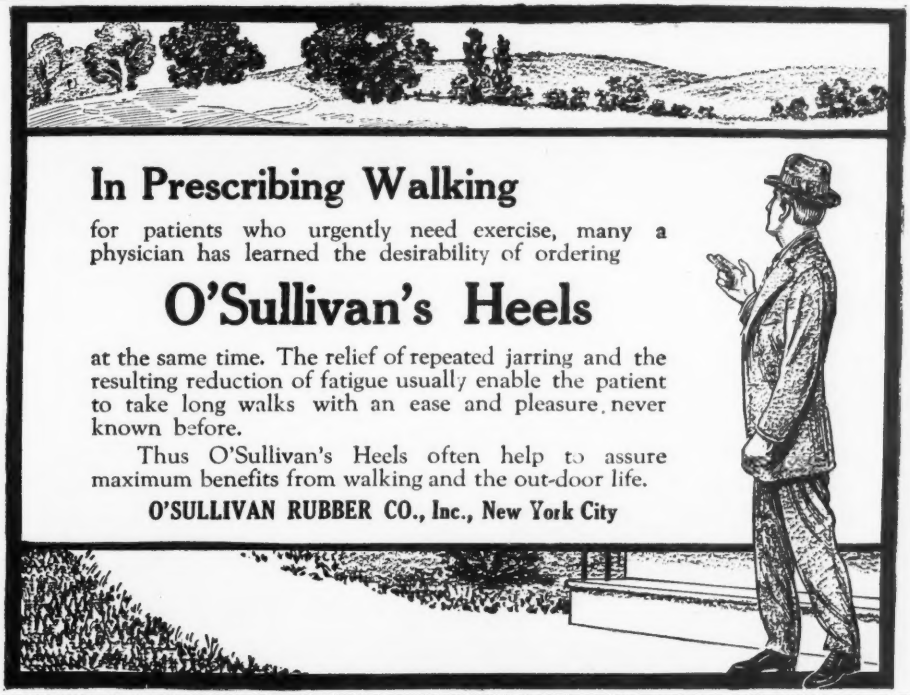

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at the same time. The relief of repeated jarring and the resulting reduction of fatigue usually enable the patient to take long walks with an ease and pleasure never known before.

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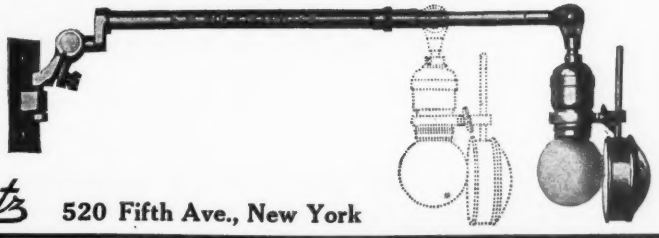

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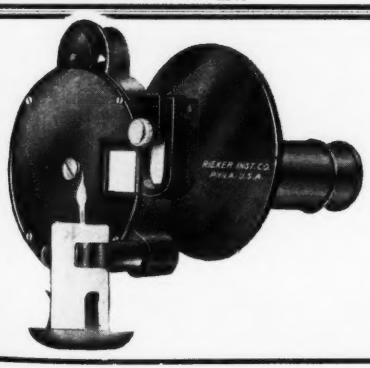

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represent something different in the treatment of suppurating wounds, and prevent septic infection, and for the treatment of acute or chronic urethritis.

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